Vol. XXXIII No. 66

THE ECONOMIC RECORD

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The Economic Record

Vol. XXXIII December, 1957 No. 66

THE AUSTRALIAN ECONOMY, SEPTEMBER 1957

The Australian economy is recovering, uncomfortably slowly, from its 1956-7 hang-over. Unemployment, after reaching a modest peak in June, is on the way down. Production and sales in most industries which suffered a setback are on the way up. As in 1951-2, so in 1955-6, the effort to prevent a boom from getting out of hand, and to restore some degree of stability, involved a temporary slowing down in the rate of real economic growth, a mild recession in business activity. The new *National Income* White Paper helps us to see the 1956-7 recession in perspective, compared with that of 1952-3. This is the first purpose of this survey. It will incidentally serve to bring Professor Downing's data on the post-war development of the Australian economy up to date and embody the substantial revision of estimates in the new White Paper. The second part will attempt to throw further light on what has happened by setting the recent ups and downs in Australian economic activity in their international context. How far is it true that the recent boom and recession were home-made, "without provocation from abroad"?[1] How far were they, as Sir Douglas Copland has suggested, merely another illustration of the dependence of Australia on economic developments in the rest of the world?[2] The last section of the survey will briefly review current conditions and prospects.

I

For a bird's-eye view of economic events over the past two years we cannot do better than turn to Professor Downing's table on *Allocation of Resources*. Table I presents his figures revised and brought up to date on the basis of the 1956-7 White Paper.[3]

1. *1957 and Beyond: An Economic Survey*, Government Printer, Canberra 1957, p. 17.

2. D. B. Copland, "The Australian Economy: A New Look", *Econ. Record*, Aug. 1957, p. 149.

3. R. I. Downing, "The Australian Economy, March 1956", *Econ. Record*, May 1956; *National Income and Expenditure 1956-57*, Government Printer, Canberra, 1957. The revisions of earlier estimates are explained in Appendix B to the White Paper. The main ones are (a) a substantial increase in the estimates of wages and salaries (in the light of the 1954 Census and improved data for wages not recorded in payroll tabulations) with consequent upward revision of national income and GNP totals; these are balanced on the expenditure side by increases in almost all components, but chiefly in (b) investment in non-farm stocks and personal consumption; there are also revisions of (c) farm incomes, (d) dwelling rents, and (e) incomes of unincorporated businesses, and (f) changes in the treatment of payments to the Wheat Stabilization Fund and of increases in the funds of marketing authorities and changes in farm stocks. Such substantial revisions of past estimates, while undoubtedly desirable if warranted by improvements in the available data, are a serious inconvenience to users of the White Paper. It is to be hoped that current compilation of White Paper data can be improved sufficiently to obviate the need for such drastic revisions in the future.

TABLE I

Allocation of Resources

(Percentage of gross national product)

	1938/9 %	1948/9 %	1949/50 %	1950/1 %	1951/2 %	1952/3 %	1953/4 %	1954/5 %	1955/6 %	1956/7 %	Average 1948/9-1956/7 %
Current Use											
Consumption (incl. fin. ent.)	71·4	65·7	62·5	56·7	62·8	61·3	62·4	64·1	64·0	63·5	62·6
Public Authorities											
Defence	1·4	1·8	2·0	2·8	4·3	4·8	3·7	3·5	3·6	3·2	3·3
Other	5·2	6·4	6·7	6·0	7·3	6·4	5·7	6·2	6·7	6·6	6·4
Income owed abroad	4·2	1·7	1·8	1·7	1·6	1·5	1·8	1·7	1·7	1·7	1·7
Total current use ..	82·2	75·6	73·0	67·2	76·0	74·0	73·6	75·5	76·0	75·0	74·0
Capital Formation											
Fixed equipment											
Public	6·3	6·3	7·3	7·9	10·2	9·2	8·7	8·5	8·3	8·1	8·3
Private	12·4	13·2	15·7	15·9	19·0	15·5	16·2	17·6	17·5	16·2	16·3
Sub-total	18·7	19·5	23·0	23·8	29·2	24·7	24·9	26·1	25·8	24·3	24·6
Stocks	1·0	3·5	5·6	6·2	9·8	−3·3	1·8	3·6	2·6	−·8	+3·2
Total capital formation	19·7	23·0	28·6	30·0	39·0	21·4	26·7	29·7	28·4	23·5	27·8
Less overseas borrowing	−1·9		−1·7		−15·0		−·4	−5·3	−4·5		−1·8
Plus overseas lending		1·4		2·9		4·6				1·4	
Gross national product	100	100	100	100	100	100	100	100	100	100	100

Source: *National Income and Expenditure 1956-7*

The table at a glance reveals a striking resemblance between the past financial year, 1956-7, and 1952-3. Both were years in which a large balance of payments deficit in the preceding year was converted into a surplus, on both occasions with some help from a providential rise in the price of wool. Both were the only two years in which the share of private fixed investment in the gross national product fell and non-farm stocks ran down. Both, though the table does not show this, were the only two years which failed to yield any significant growth of total real national product and employment, and which saw the emergence of some unemployment. In both cases, price and wage inflation continued for some time after the elimination of excess demand.

The combination of these facts in each of the two years was, of course, no accident; they were all part of the same sequence of events. In the boom years 1954-5 and 1955-6, as in 1951-2, Australia lived beyond her means. Abnormally high rates of investment expenditure, added to the steadily rising consumption expenditure of a growing population, made greater demands on resources than the domestic economy could satisfy. When the balance of payments deficit which for a time filled the gap could no longer be financed, the coat of domestic real expenditure had to be cut to the cloth. *All* forms of expenditure, consumption, private investment in fixed capital and stocks, and government expenditure, had to be reduced relatively to the gross national product. On both occasions, the price of disinflation was a year of business doldrums and the forfeiture of at least part of a normal year's economic growth.

Source: *National Income and Expenditure 1956-7*

Tables II and III show that the resemblance between 1956-7 and 1952-3 extends further. In both years, the combination of domestic recession and a rise in export prices brought a shift in the distribution of incomes in favour of farmers (and stable high interest rates a slight rise in the share going to recipients of net rent and interest). The share of all other groups, wages and salaries, unincorporated businesses and company profits, fell. In Table III, the effects of the correction of a balance of payments deficit through disinflation show themselves in a sharp increase in the proportion of total capital formation financed by private saving (from under one-half to almost the whole in 1952-3; from two-thirds to three-quarters in 1956-7).

There were, however, also important differences between 1956-7 and 1952-3. The 1956-7 recession has been a good deal milder. Whereas in 1952-3 real national product probably did not increase at all (the price level, measured by the C-series index, rose by the same percentage on 1951-2 as GNP at current prices), there appears to have been some small gain in 1956-7 (GNP rose by 7 per cent, retail prices by 6 per cent). Registered unemployment represented 1·8 per cent of the work force (civilian employment plus registered unemployed) at the peak in the June quarter 1957, as compared with a peak of 2·6 per cent in the December quarter 1952-3.[4] Since price and wage inflation during the 1954-6 boom, in the face of falling export prices, never assumed the

4. See Graph II below.

TABLE II

Shares of Gross National Product

	1948/9	1949/50	1950/1	1951/2	1952/3	1953/4	1954/5	1955/6	1956/7
	%	%	%	%	%	%	%	%	%
Farm Income	14·1	16·5	20·9	11·4	13·6	11·0	9·1	8·5	9·0
Wages, salaries, forces	47·2	44·9	42·4	50·1	49·5	49·3	49·8	50·4	49·7
Other private income—									
Uninc. businesses	10·0	9·6	8·9	10·2	9·7	9·5	9·7	9·6	9·2
Company income	9·4	9·3	10·7	9·8	9·0	10·4	10·6	10·0	9·7
Depreciation allowances	4·2	5·6	5·4	3·8	4·4	4·9	5·5	6·1	6·1
Rent and Interest	5·0	4·4	3·6	3·8	3·9	4·0	4·3	4·5	4·6
Sub-total	28·6	28·9	28·6	27·6	27·0	28·8	30·1	30·2	29·6
Surplus, public trading	·4	·2	..	..	·2	·6	·7	·5	·8
Indirect taxes, *less* subsidies ..	9·7	9·6	8·2	19·9	9·8	10·2	10·4	10·4	10·9
Gross National Product	100	100	100	100	100	100	100	100	100

Source: *National Income and Expenditure 1956-7*

TABLE III

Sources of Capital Funds

(Percentage of gross national product)

	1938/9 %	1948/9 %	1949/50 %	1950/1 %	1951/2 %	1952/3 %	1953/4 %	1954/5 %	1955/6 %	1956/7 %	Average 1948/9-1956/7 %
Personal savings	3·7	8·6	11·3	13·3	10·3	12·3	8·8	7·4	7·2	7·4	9·6
Other private savings	10·4	9·4	10·4	11·9	8·5	8·6	10·9	10·9	10·8	10·2	10·2
Government current surplus	3·7	5·9	4·3	4·7	7·7	5·8	7·3	6·5	5·8	7·2	6·1
Marketing authorities and government capital transfers	—	·4	·9	3·1	−2·4	−·5	−·5	−·4	·1	..	·1
Overseas indebtedness	+1·9	−1·4	1·7	−2·9	15·0	−4·6	·4	5·3	4·5	−1·4	1·8
Total capital formation	19·7	23·0	28·6	30·0	39·0	21·4	26·7	29·7	28·4	23·5	27·8

Source: *National Income and Expenditure 1956-7*

same proportions as during the Korean war boom of 1950-2, the aftermath during 1956-7 was also less than it had been in 1952-3 (retail prices in 1956-7 were 6 per cent higher than in the preceding year as compared with 9 per cent in 1952-3; nominal wage rates 5 per cent as compared with 11 per cent). Despite the larger rise in prices, retail sales were down in 1952-3, but up a little in 1956-7.

The impact of the recession on different industries was also different. On both occasions, credit restraint fell most heavily on housing and consumer durables. On both occasions, the output of the basic industries continued to increase, spectacularly so in the case of iron and steel and electricity. But whereas the recession of 1952 was primarily a textile recession, textile production rose in 1956-7 from its relatively low 1955-6 levels. The fall in housing activity was less pronounced and prolonged, but sharp tax increases hit the motor-car industry and breweries rather harder.[5]

Finally, the role and timing of fiscal policy action differed in the two cases, the difference showing in the third row of Table III. The Korean War boom inflation was halted in the latter half of the financial year 1951-2 primarily by the development of a huge balance of payments deficit, the product of a sharp fall in the price of wool and a delayed import boom. Disinflationary action, in the "horror" budget of September 1951, merely reinforced the effect of the swing in the balance of payments, yielding a greatly increased budget surplus in 1951-2, but permitting a reduction in forced saving through the budget in the recession year 1952-3. In 1955-6, the balance of payments deficit was the *consequence* of domestic inflation. It required severe import restrictions, reinforced by credit restraint and belated disinflationary action in the "Little Budget" of March 1956, to stop the drain on international reserves. The budget surplus, therefore, on this occasion increased in the recession year 1956-7.

The experience within a decade of two hectic booms followed in each case by a year of relative stagnation inevitably prompts the question whether Australian economic development must proceed in such wild fits and starts; or, to formulate it more sharply, whether it is really necessary for this country to forgo one year's economic growth in five for the sake of stability. Sir Douglas Copland, in his essay in the last issue of the *Economic Record*, warned us against "excessive devotion to stability" and criticized "those who dwell too much upon the fears of inflation in a period of expansion, and are likely to impede expansion by an over-emphasis upon measures designed . . . to restrain total expenditure in a phase of growth".[6]

At first sight, Sir Douglas seemed to be saying that the Australian economy was expanding nicely in 1953-4, 1954-5 and 1955-6 and, but for excessive devotion to stability "in some quarters",[7] could have gone on doing so in 1956-7, though it might have meant "some disturb-

5. For further details, see Table V below.
6. D. B. Copland, *op. cit.*, p. 143.
7. *Ibid.*

ance and cost to those who cannot hedge against rising prices."[8] But without credit restraint, and all too belated fiscal action, price and cost inflation would certainly have continued for some time, very probably with increasing momentum. Such inflation would not merely have caused some disturbance to those who cannot hedge against inflation (and the more people learn to hedge the faster the inflation); it would have steadily enlarged the evil legacy of higher costs, taxes and interest rates, smaller international reserves and tighter import restrictions which, as the 1957 *Economic Survey* points out, even the 1954-6 boom has bequeathed to us.[9] Moreover, each turn in the spiral of unrestrained inflation would have increased the risk of collapse of the currency, externally and internally.

Obviously, no one could advocate such a policy with open eyes. The only practicable choice is between something like the course which has actually been pursued, of giving the boom its head and then pulling up with a jerk, and a policy of restraining each boom sufficiently to avoid the need for belated action so drastic as to produce a recession. The answer is not as obvious as might appear. For while the latter course would in some ways be more comfortable, the former might well yield a higher long-term rate of growth in a private enterprise economy. Sir Douglas's otherwise most acceptable precept to "seek to reduce the degree of instability to a minimum, whilst preserving the maximum rate of expansion consistent with the resources available at home and abroad"[10] gives no unambiguous answer to this question.

Before turning to the second section of this survey, it may be worth drawing attention briefly to one or two other facts about recent economic trends revealed by Table I. Partly because of the revision of national income data, partly because it covers a longer period, the table shows one or two interesting differences from Professor Downing's corresponding table of two years ago.

The share of consumption in GNP has remained fairly constant in the last few years and has averaged 62·5 per cent over the nine-year period, rather more than over Professor Downing's five years (1950-1—1954-5). Contrary to constantly reiterated press opinion, the share of Government has fallen steadily in the last six years, from 21·8 per cent in 1951-2 and 20·4 per cent in 1952-3 to 17·9 per cent in 1956-7. The fall in the total is the result of a substantial fall in the share of defence expenditure (from 4·8 per cent in 1952-3 to 3·2 per cent in 1956-7) and in public works (from 10·2 per cent to 8·1 per cent) and a fairly stable share of other public authority expenditure. The fall in the share of public investment is particularly striking compared with the rise in private investment in fixed equipment in every year since 1952 (except the last). It underlines the urgency of Sir Douglas Copland's warning that "if the economy is to develop in balance on the economic and social

8. *Ibid.*, p. 144.
9. *1957 and Beyond*, p. 17. Sir Douglas Copland's quotation out of the context from this paragraph (*loc. cit.*, p. 147) was a little less than fair to the authors of the *Economic Survey*.
10. D. B. Copland, *op. cit.*, 143.

front, it is vital that public investment should be pursued with both vigour and confidence''.[11]

Over the nine-year period, the average rate of capital formation appears to have exceeded the pre-war rate by rather less than Professor Downing's figures suggested. Total capital formation, at 27·8 per cent of GNP, was only 8 per cent higher than in 1938-9. If, as he suggested, an excess of 6 per cent was needed to maintain per capita real income with 1½ per cent higher rate of population growth, this would have left only 2 per cent for higher productivity or, on his assumption of a 4:1 capital-output ratio, enough only for an increase of productivity of ½ per cent p.a. above the pre-war rate. The figure for total capital formation, moreover, includes 3 per cent for investment in stocks, much of which is accounted for by inventory revaluation and represents no real capital formation. Although we have no reliable data, it seems difficult to believe that the growth of productivity in the post-war years has been no higher than in the 'thirties. Perhaps the marginal capital-output ratio has been a good deal lower than 4:1. (It is high time that some attempt was made to measure capital-output ratios in the main sectors of the Australian economy.)

Finally, it comes as a surprise to find that, over the nine years, overseas borrowing contributed less than 2 per cent to Australia's gross national product (though this purely quantitative statement which lumps together the flow of direct investment and changes in London funds is, of course, rather misleading). On the other hand, it is worth noting that the share of income owed abroad has increased no further since 1953-4; so much for the author's extrapolation in the last issue of the *Economic Record*.[12]

II

In this section, an attempt will be made to review recent changes in the Australian economy in a wider setting. The first three articles in this survey series, like most public discussion, carried on their diagnosis and forecasts of Australian business conditions primarily in terms of domestic influences.[13] In particular, there has been very general agreement that the 1954-6 boom and subsequent recession were home-made.[14]

How far is this true? How far has Australia become independent of the rest of the world in her economic fluctuations? How far is she still a dependent or at least, as Sir Douglas Copland puts it, a ''semi-dependent'' economy?[15] Clearly, the greater the degree of dependence,

11. *Ibid.*, p. 148.
12. "Overseas Borrowing—The New Model", *Econ. Record*, Aug. 1957, p. 258.
13. The "gap" analysis of aggregate supply and demand, though it necessarily brings external factors into the picture through the balance of payments, probably tends to reinforce this insular approach.
14. Cf. the quotation from the 1956 *Economic Survey* quoted by Professor Rowan, *Econ. Record*, Nov. 1956, p. 206, n. 39, and Professor Downing's statement (*op. cit.*, p. 3): "This has been, in fact, a domestic inflation."
15. D. B. Copland, *op. cit.*, p. 143.

the greater the need for Australian economic forecasting to concern itself with overseas economic developments.

Graphs I-IV summarize the trend of business activity in Australia, the United Kingdom and the United States over the past eight years or so. In one important respect, all four tell the same story. There is a suprising similarity in the ups and downs of business activity in Australia and the United Kingdom and a perhaps even more surprising dissimilarity between both and the United States. Neither of the two post-war inventory recessions in the U.S.A., of 1949 and 1954, appears to have had a significant influence on British and Australian domestic conditions. Conversely, although the American economy felt the effect of the Korean war boom on prices, neither that boom nor the subsequent recession, nor the 1954-6 boom and recession, which represent the major movements both in Australia and the United Kingdom show up clearly in the American graphs.[16] Clearly, *if* Australia has imported her post-war economic fluctuations from Britain or the United States, the immediate source has been the former, not the latter. Let us examine this hypothesis further.

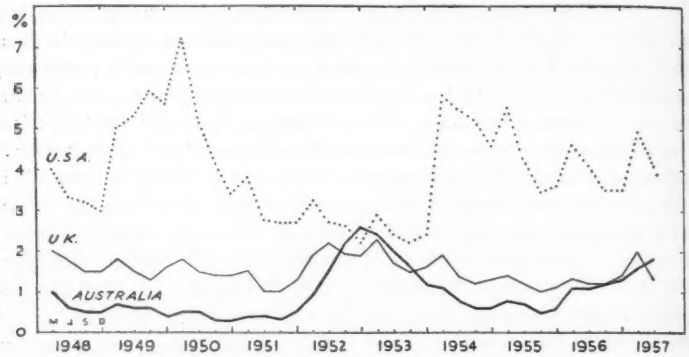
Graphs V-VIII compare economic movements in Australia and the United Kingdom in four other fields, an employment index (ratio of unfilled vacancies to registered unemployed), bank advances, international reserves, and housing commencements. Again, the parallelism is most striking. The turning points in the demand for labour coincided in both countries in 1952 and 1955, and Australia lagged by only one quarter in 1951. In the case of bank advances, the Australian turning points in the 1952 recession were delayed for some months by the expansion and subsequent repayment of advances to finance the holding of large excess stocks of imports in that year; but the decline of 1955 in Australia began only a month after Britain and the upturn this year similarly coincided in both countries, allowing for seasonal movements. The parallel movement in international reserves is hardly less impressive, even when allowance is made for the fact that changes in Australia's London funds in part account for changes in the United Kingdom's (Sterling Area's) gold and dollar reserves. The graph for housing commencements shows the greatest divergence of the four; whereas in Australia housing activity has fluctuated broadly in step with general economic activity, in Britain the conservative Government's enlarged housing programme, by a fortunate coincidence, got

16. Attention may be drawn to a few other points of interest in these four graphs. *Graph I.* Note the marked difference in the average unemployment percentages of the three countries over the period (Australia 0·9 per cent, U.K. 1·5 per cent, U.S.A. 3·9 per cent). *Graph III.* Note the remarkable stability of the cost of living which the U.S.A. was able to maintain from 1952 until 1956; contrast Australia which achieved complete stability in only 2 quarters out of 25. *Graph IV.* Note that the Australian share market, while closely in line with the British, was relatively much less buoyant in 1954-6 when wool prices were low than in 1950-1 when wool prices were high; note also the frequent echoes of American movements in the British but hardly in the Australian index.

GRAPH I

Unemployment

(Registered unemployed as percentage of workforce)

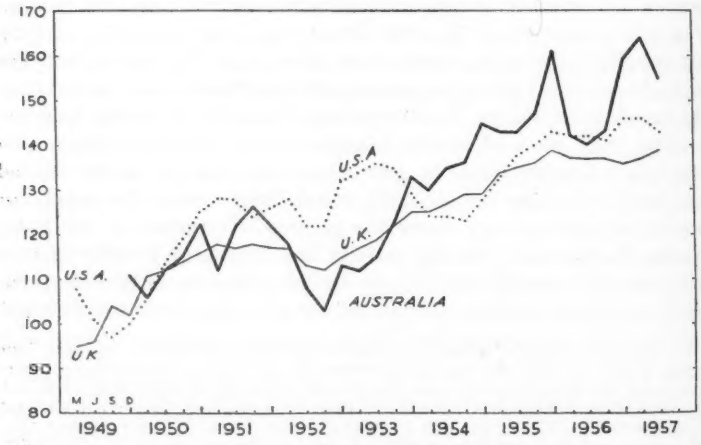


Sources: Australia: *Monthly Review of Business Statistics.*
U.K.: *London and Cambridge Economic Service.*
U.S.A.: *Federal Reserve Bulletin.*

GRAPH II

Industrial Production

(Index, seasonally adjusted)

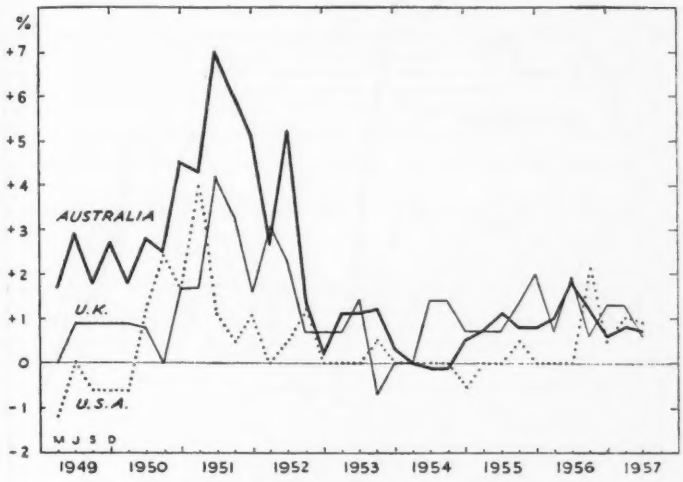


Sources: Australia: A.N.Z. Bank index (1948-9 = 100).
A.N.Z. Quarterly Review.
U.K.: *Monthly Digest of Statistics.*
U.S.A.: *Federal Reserve Bulletin.*

GRAPH III

Retail Prices

(Percentage change of retail price index from preceding quarter)

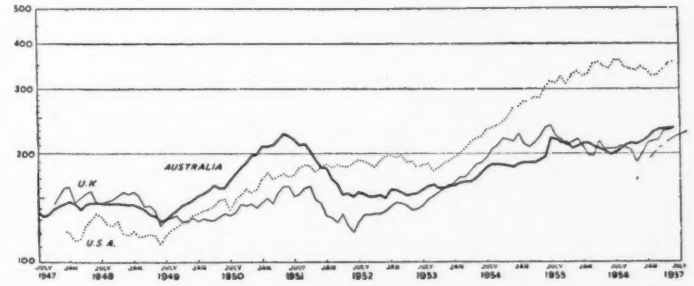


Sources: Australia: *Monthly Review of Business Statistics.*
U.K.: *Monthly Digest of Statistics.*
U.S.A.: *Federal Reserve Bulletin.*

GRAPH IV

Share Prices

(All ordinary shares index)

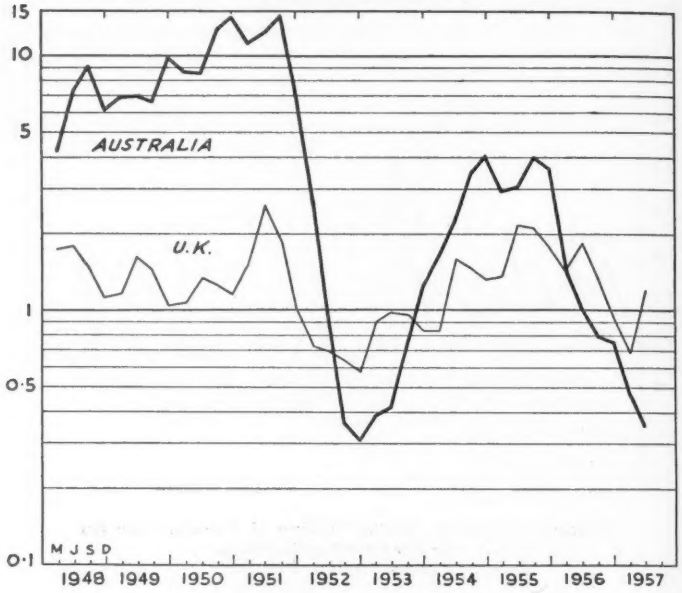


Sources: Australia: Index constructed and kindly made available by Mr. D. Lamberton, University of New England.
U.K.: 31/12/1938 = 100; *Monthly Digest of Statistics.*
U.S.A.: 1935-9 = 100; Standard and Poor index to September 1955; Security and Exchange Commission index from October 1955; *Federal Reserve Bulletin.*

GRAPH V

Demand for Labour

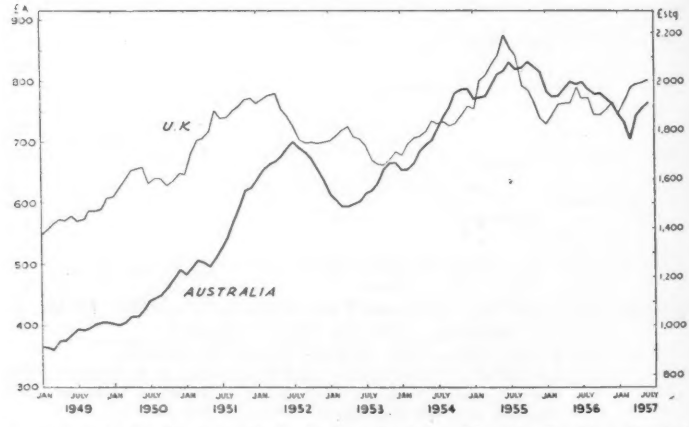
(Ratio of unfilled vacancies to registered unemployed)



Sources: Australia: *Monthly Review of Business Statistics.*
U.K.: *Monthly Digest of Statistics.*

GRAPH VI

Bank Advances

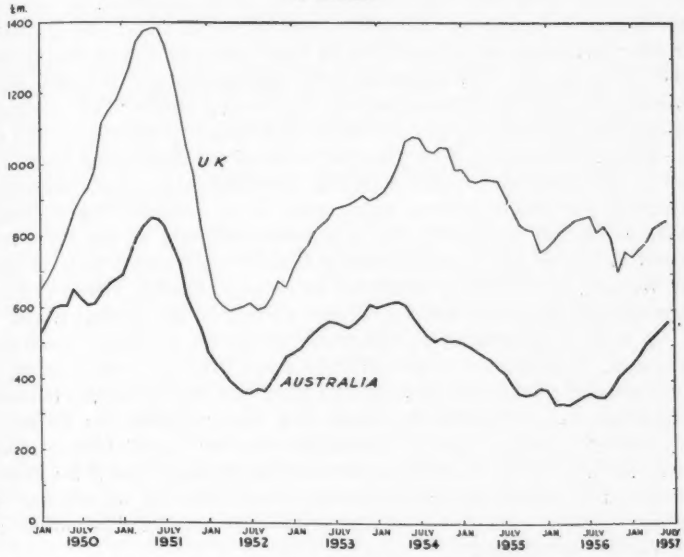


Sources: Australia (major private trading banks): *Monthly Banking Statistics.*
U.K.: *Monthly Digest of Statistics.*

GRAPH VII

International Reserves

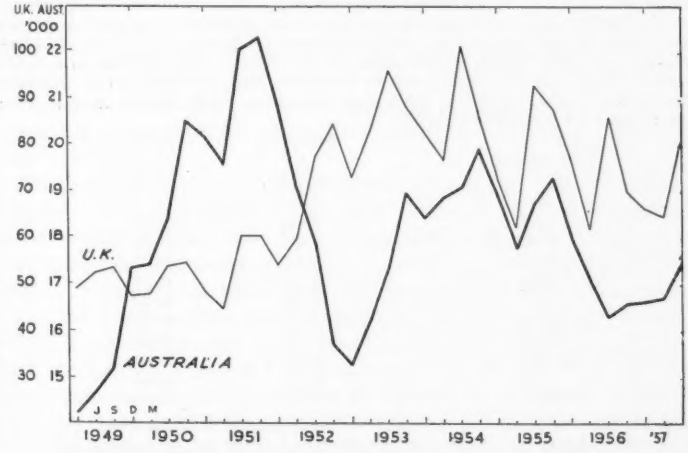
£ million



Sources: Australia: London funds; Commonwealth Bank, *Statistical Bulletin.*
U.K.: Gold and dollar reserves; *Monthly Digest of Statistics.*

GRAPH VIII

Housing Commencements



Sources: Australia: *Monthly Review of Business Statistics.*
U.K.: *Monthly Digest of Statistics.*

going in 1952, alleviating the 1952 recession. Since 1954, however, housing activity in both countries has again moved closely in step.[17]

How are we to interpret these facts? There is little difficulty about the 1949-51 boom and 1952 recession. No doubt Australia on her own would have experienced a domestic post-war boom which would sooner or later have come to an end. But in their dimensions and timing, the 1949-51 boom and 1952 recession were unquestionably imported from overseas, through a phenomenal rise and then a smaller fall in export prices and earnings. World shortages of primary products, capped by the Korean war boom, were the chief cause of the Australian boom, the fall in wool (and metal) prices in 1951 the chief cause of the downturn, although the recession was aggravated by a delayed import boom. Britain was not the source, but a fellow beneficiary of the boom and fellow victim of the (predominantly textile) recession which affected all Western countries in much the same way, though rising defence expenditure prevented any significant decline in the United States.

But this explanation will obviously not do for the 1954-6 boom and recession. Throughout the period from June 1953 until quite recently, Australian export prices have moved *inversely* with domestic business conditions, falling during the boom and rising during the recession. But how else, except through fluctuations in her export earnings, can Australia import her domestic economic fluctuations? And if the 1954-6 boom and recession were entirely home-made, how do we account for the remarkable coincidence of almost exactly parallel fluctuations in the United Kingdom?

17. One other parallel between British and Australian post-war economic developments may be noted here. It has frequently been pointed out by British economists that there was a marked increase in the propensity to save in the United Kingdom between 1950 and 1952, a shift which has usually been attributed to the ending, about that time, of the post-war phase of abnormally high public liquid asset holdings and backlog of consumer demand. The revised national income data for Australia in the new White Paper make necessary a revision of the estimates for the relation between consumption and non-farm disposable incomes which was recently put forward as the most useful consumption function for Australia (*Econ. Record*, April 1957). The revised data for the ratio of consumption to non-farm disposable income in Australia compare as follows with the ratio of consumption to personal disposable incomes in the United Kingdom. (U.K. figures at 1948 prices, from a paper by Professor Paish.)

Year ending	Australia $\frac{C}{NFDI}$	U.K. $\frac{C}{PDI}$
1947	1·02	0·75
1948	1·03	0·72
1949	1·02	0·71
1950	1·01	0·71
1951	0·99	0·70
1952	0·97	0·68
1953	0·97	0·68
1954	0·97	0·68
1955	0·97	0·68
1956	0·97	0·67

It appears that the Australian ratio did not settle down to a stable level until 1951-2 On the other hand, the change in the preceding years closely corresponds to the change in the U.K. and may be susceptible to the same explanation.

There are, of course, other economic links than Australian exports between the Australian and British economies, channels through which economic developments in the United Kingdom could influence business conditions in Australia. Cost and price inflation in Britain may be transmitted to Australia through rising import prices. Ups and downs in the flow of British capital to Australia could have stimulating or depressive effects. The Australian share market might be influenced directly by movements on the London stock exchange. And there is certainly a connection between movements in British and Australian interest rates. But none of these links (and there may be yet others) seems strong enough to have much significance for general movements in business activity.

Rising import prices could raise costs but hardly contribute to a boom; in any case, they rose very little during the period. Capital imports have fluctuated, but one's impression is that the changes have been *in response to* changes in Australian business conditions (cf. the fall in the inflow of American as well as British capital in 1952-3, following the 1952 recession). Close examination of Graph IV strongly suggests that the Australian share market is frequently influenced by movements in London, but there is very little reason to believe that stock exchange movements have much influence on business conditions in Australia. Australian interest rates certainly did follow British rates upwards both in 1951-2 and in 1955-6. Nor was this mere coincidence. The fact that interest rates had risen in the United Kingdom was advanced as one reason for allowing them to rise in Australia. But it was only one reason and not the most important; and in so far as monetary policy can be said to have influenced the course of business fluctuations, changes in interest rates in both countries have been but one weapon in its armoury, reinforcing more direct methods of credit relaxation or restraint.

There is, moreover, one fairly conclusive reason for scepticism about any suggestion that Australia has imported her fluctuations directly from the United Kingdom, and that is the absence of almost any lag of the Australian behind the British ups and downs. The virtual simultaneity of the turning points strongly suggests that British and Australian fluctuations had a common origin, rather than one being the result of the other.

We have already noted that this was true of the 1950-1 boom and subsequent recession. In both countries, economic activity resumed its upward trend in 1953, aided by the stimulus given to American business by increased defence expenditure and by very rapid growth in Western Europe, especially West Germany, which also cushioned the rest of the world against any serious effects of the American recession of 1954. Both in Australia and in the United Kingdom, a strong investment boom quickly restored full employment and, by 1955, began to outrun domestic resources, leading to balance of payments difficulties and later to renewed wage and price inflation. In both countries, Governments attempted to restrain the boom by monetary policy and some

months later by disinflationary budget measures.[18] In both countries, the disinflation took effect about the same time: the pressure of excess demand began to ease in the last quarter of 1955 and then continued to fall off until the March quarter of 1957. The coincidence becomes much less surprising once it is recognized as part of a pattern common to a much larger part of the world. The following passages from the United Nations *Economic Survey of Europe in 1956* might be a description of events in Australia and the United Kingdom, but in fact refer to Western Europe:

> "The chief characteristics of economic developments . . . in 1956 were the slowing down of expansion and the speeding up of wage increases. . . . The increase in industrial production levelled off. . . . This was largely due to the slackening in the output of the metal-using industries which, together with chemicals, had been the main force of industrial expansion during the period of rapid upswing. . . . On the other hand, textile production, which had been stagnating since the middle of 1954, staged a definite recovery in the second quarter of 1956.
>
> "The upward drift of prices in the earlier part of the year was mainly the result of the pressure of domestic demand on already fully employed resources and only to a very slight extent due to the external influence of import prices. This, together with balance of payments difficulties in some countries, was taken by most governments as a danger signal leading them to reinforce existing measures, or to take new steps, to restrain the growth of demand. . . . It was only to be expected that a rate of growth which, in the past, was rendered possible through the existence of manpower reserves and under-utilized capacities, could no longer be maintained once a phase of full employment had been entered. In addition, however, and more important in most cases in checking the pace of expansion, there were the restrictive policies applied in most countries to reduce the pressure of demand on resources."[19]

Comparative statistics published by the United Nations suggest that those countries which had experienced the longest boom and generally kept their economies running as close as possible to full employment were the first to be forced into measures to restrain inflation. They included the United Kingdom and the Netherlands in the last months of 1955, followed in the first quarter of 1956 by Sweden, Denmark, Norway and Belgium. West Germany faced the same problem six months later. In France, Italy and Switzerland, on the other hand, "the availability of unused capacities and large manpower reserves made it possible for all sectors to participate in the industrial boom".[20] In the United States, too, the boom continued practically unabated through 1956, though it has since then levelled off.

18. Directives to trading banks to stop further expansion of advances were issued in the United Kingdom in July and in Australia in September 1955; supplementary budgets were introduced in the United Kingdom in October 1955 and in Australia in March 1956.

19. *United Nations, Economic Survey of Europe in 1956*, Geneva 1957, pp. 1, 4.

20. See United Nation, *Economic Bulletin for Europe*, May 1956, May 1957.

The conclusion to which we are led is that the question whether the Australian boom and recession of 1954-6 were home-made or imported admits of no clear-cut answer. They were certainly not imported in the traditional Australian manner, through fluctuations in export prices, as was largely the case in 1950-1 and 1951-2. Nor does it appear that any other direct influence of British business conditions was responsible. In this sense, the Australian boom and recession were home-made, just as were the parallel booms and recessions in the U.K. and most countries of Western Europe. But the parallelism was obviously not mere coincidence. Not only did the various national booms start more or less simultaneously, following the common experience of the Korean war boom and post-Korean recession, but once under way the swing in each country, through various channels, stimulated expansion in others.[21] In this sense, even Australian exports played a part: Australia was able to sell a substantially increased *volume* of exports without a *more serious* fall in export prices only because of rapidly rising world demand. The timing of the pause in the boom, and the degree of recession, seem to have been a function mainly of the intensity of each country's full employment target: the higher the target, the earlier the emergence of inflation and the greater the difficulty in restoring stability without causing some temporary break in prosperity.

A word of caution should be added lest the virtual absence of the American economy from this story create a wrong impression. The post-war economic stability of the United States has belied all prophecies. The U.S.A. has so far suffered only two recessions, the first of which, in 1949, caused trouble in Europe but made no noticeable dent in Australia's post-war boom, while the second, in 1954, was offset in its external effects by exceptionally rapid growth in Western Europe. But we should not, on that account, underrate the enormous influence which business conditions in the U.S.A. exercise on the rest of the world, including Australia. In so far as Australian business conditions still depend largely on world demand for wool and other export commodities, the general state of American business and specific American policies continue to be of preponderant importance. The Korean commodity (and especially wool) boom, for instance, and the subsequent

21. This is the answer to one of Sir Douglas Copland's points. He argues that post-war price inflation in Australia has been almost entirely imported from abroad. "No doubt this pressure (of demand on internal resources) is a factor in causing prices to rise, but it is far less powerful than the prices of exports and imports" (*op. cit.*, p. 149). He refers in evidence to the rise in prices in Australia during 1950-3 and the smaller movements in the next three years. Even if we could accept the implication that the 4½ per cent rise in Australian retail prices in 1955-6 was the result, not of domestic excess demand, but of a 2 per cent rise in import and a 2 per cent fall in export prices, it will hardly do to put the blame for Australia's price inflation on other countries. Every other "semi-dependent" economy, including the United Kingdom, could use the same argument, leaving as the nigger in the woodpile the "independent" United States—which had no price inflation at all! Is not the true position that every country, including Australia, has through its own boom, contributed to price inflation everywhere else? In the long run, of course, Sir Douglas Copland's thesis that Australia's price and cost structure cannot, with a fixed exchange rate, get far out of line with that of the rest of the world is substantially valid.

textile recession which was its direct consequence, largely resulted from the ups and downs in American defence purchases. Similarly, American surplus disposal policy has been a major factor in determining the trend of wheat and other food commodity prices in the past five years. The American boom of 1955 and 1956 has sustained and reinforced expansion everywhere. All countries, including Australia, would very soon feel the impact of any serious falling off in American economic activity.

III

Tables IV-VI present the statistical evidence so far available for the statement at the beginning of this survey that the Australian economy has passed the trough of the 1957 recession.

TABLE IV

Employment

Year and Month	Unfilled Vacancies	Registered Unemployed	Recipients of Unemployment Benefit	Civilian Employees
	'000	'000	'000	'000
1955–56				
Sept.	60·2	15·1	1·8	2,747
Dec.	58·8	16·3	3·2	2,771
March	44·9	30·7	6·5	2,782
June	32·5	31·5	7·0	2,785
1956–57				
Sept.	27·0	33·8	9·6	2,777
Dec.	28·8	37·9	13·3	2,786
1957				
March	21·7	46·5	13·1	2,798
April	20·7	46·1	15·5	2,787
May	19·8	51·2	16·0	2,791
June	18·4	52·2	18·1	2,789
July	18·8	53·1	20·3	2,784
Aug.	20·8	51·3	20·2	2,781
Sept.	22·2	48·7	19·0	

Sources: Department of Labour and National Service, *Monthly Review of Employment Situation* (News release); Commonwealth Statistician, *Monthly Bulletin of Employment Statistics.*

Unemployment reached its peak in June, although there was a slight further seasonal increase in the number of registered applicants in July. The Department of Labour August and September figures showed small increases in the demand for labour, even allowing for a seasonal element. (This is not borne out by the Commonwealth Statistician's figures for civilian employment which unaccountably declined further in July and August.) Industrial production of almost all industries which suffered a decline was rising again by the June quarter. Other indicators of business activity tell the same story. Housing commencements have been rising again steadily since the June quarter of 1956, although completions in the June quarter of 1957 still reflected the slack in commencements in the previous year and the favourable effect of the revival of housing on activity in the building industry has

TABLE V

Industrial Production

(Percentage change on corresponding quarter of 1955-6)

	1956–57			
	Sept.	Dec.	March	June
Basic Materials				
Black coal	− 0·2	+ 5·5	+14·7	− 3·0
Brown coal	+ 5·6	+ 0·8	+ 5·2	+ 3·7
Pig Iron	+15·6	+13·2	+10·1	− 1·1
Refined zinc	+ 3·1	+ 0·1	+ 4·1	+ 2·0
Ingot steel	+14·4	+24·9	+26·8	+17·8
Electricity	+10·8	+ 9·8	+ 9·9	+ 8·3
Building Materials				
Clay bricks	− 8·6	− 7·7	− 0·5	+ 6·4
Cement building sheets	−13·1	−15·6	− 5·1	− 7·1
Terra cotta roofing tiles	− 8·5	−14·6	−11·7	− 5·0
Portland cement	+ 9·5	+ 7·5	+13·7	+13·7
Consumer Durables				
Washing machines	−19·6	−18·7	− 8·5	− 1·4
Refrigerators	−16·7	−27·3	−24·3	−15·2
Radios and radiograms	−26·7	−21·4	−12·1	−10·5
Car and utility bodies	−18·3	− 8·5	+ 5·6	+ 9·6
Textiles				
Cotton yarn	+ 3·3	+13·2	+ 8·0	+ 8·6
Worsted yarn	+ 9·2	+13·0	+11·5	+ 5·7
Broad woven cloth	+10·1	+27·1	+ 7·3	+19·9
Boots and shoes	+ 6·2	+11·8	+ 5·9	+ 5·7
Miscellaneous				
Beer	− 8·8	− 2·2	− 7·7	+ 7·1
Tobacco, cigars & cigarettes	+ 1·6	+ 8·3	+ 9·0	+10·1
Ice cream	+ 2·5	− 0·1	− 9·3	+ 6·8
Newsprint	+ 3·0	− 2·9	+ 1·8	+ 2·0
Floor coverings	+20·3	− 5·0	+58·2	+19·4
Superphosphate	−19·5	−24·6	− 3·6	+14·0
Ready mixed paint	− 6·5	+ 2·6	+ 4·8	− 2·8

Source: Commonwealth Statistician, *Monthly Bulletin of Production Statistics.*

been largely offset by a sharp and continuing falling off in other construction, chiefly of offices and business premises (factory construction rose again in the June 1957 quarter). Motor car registrations have been rising, somewhat unsteadily, since their low point in the June quarter of 1956, following the shock of the Little Budget, and registrations of commercial vehicles since their low point in the March quarter of 1957. Retail sales looked like having reached their low point in the June quarter of 1957.

Disinflation has had the desired effect of slowing down the rise in prices and wages, though the effect has been longer in coming and less marked than might have been expected. A steady rise in import prices during 1956-7 has probably been one factor making for further retail price increases which, in turn, have prevented the achievement of more complete stability of wage rates. The falling off in average weekly earnings relative to nominal wage rates in the June quarter of 1957 reflected the decline in the demand for labour in that quarter and can be expected to be reversed as business conditions pick up.

TABLE VI

Other Indicators of Business Activity

(Percentage change on corresponding quarter of preceding year)

Year and Quarter	Building Commencements		Motor Vehicle Registrations		HP New Agreements	Retail Sales	Bank Advances
	Houses	Other	Motor Cars	Other			
	%	%	%	%	%	%	%
1955–56							
Sept.	− 2·4	+34·5	+10·5	+ 1·0	+10·8	+9·2	+12·9
Dec.	− 5·2	+48·5	+10·4	+ 4·5	+ 9·2	+7·7	+ 6·7
March	− 3·7	+21·2	− 1·4	+10·6	+ 9·2	+7·5	+ 2·3
June	−13·1	+19·3	−23·1	− 5·4	+ 0·6	+5·7	− 1·2
1956–57							
Sept.	−14·9	+ 7·6	−21·3	−16·4	− 4·2	+3·7	− 3·8
Dec.	− 7·8	− 7·4	−12·3	−13·7	− 0·1	+3·6	− 5·3
March	− 2·3	−16·4	+ 0·3	−21·6	+ 3·7	+3·4	− 4·5
June	+ 7·0	−12·4	+ 5·9	− 2·9	+ 6·2	+3·4	− 3·8
1957–58							
Sept. ..	+ 9·0	..	+ 1·4	+ 6·3	+12·3	..	− 1·8

Sources: Building Commencements, Motor Vehicle Registrations, HP Agreements: Commonwealth Statistician, *Monthly Review of Business Statistics.*
Retail Sales (revised series): Commonwealth Statistician.
Bank Advances: Commonwealth Bank, *Statistical Bulletin.*

The level of economic activity, then, is once again on the upgrade. But the forces making for a revival of boom conditions, let it be admitted, have been much weaker and slower than most economists (including the author) had expected. Professor Rowan, writing in September 1956, concluded that "some resurgence of excess demand during the forthcoming [financial] year is more probable than renewed disinflation".[22] Professor Karmel, writing in March 1957, again expected "a slight revival of inflationary pressures . . . for the remainder of 1957", but already then raised the question: "Since the balance of payments has already undergone a substantial shift in an expansionary direction, we may ask why this revival has not already taken place".[23] The author at the time fully concurred in Professors Rowan and Karmel's judgment. Since a halting revival, still far short of inflationary dimensions, did not come until the June or even September quarter of 1957, Professor Karmel's question has become more pertinent still. Why was there no resumption of inflationary pressures as a result of the large improvement in the balance of payments in the first half of 1957?

Part of the answer is, no doubt, as Professor Karmel suggested, "the lag between higher farm income and expenditure".[24] On this

22. D. C. Rowan, "The Australian Economy, September 1956", *Economic Record*, November 1956, p. 204.
23. P. H. Karmel, "The Australian Economy, April 1957", *Economic Record*, April 1957, p. 18. Writers of these survey articles are learning, in the words of an article in *Fortune*, "Why Business Forecasters Grow Old Fast".
24. P. H. Karmel, *op. cit.*

TABLE VII

Prices and Wages

(Percentage change on preceding quarter)

Year and Quarter	Retail Prices %	Wholesale Prices %	Export Prices %	Import Prices %	Nominal Wage Rates %	Average Weekly Earnings %
1955–56						
Sept. ..	+0·6	+0·6	−7·1	+1·3	+0·5	+1·4
Dec. ..	+1·1	+0·6	+2·5	+0·7	+1·4	+1·6
March ..	+1·0	+2·3	−2·4	+0·5	+0·8	+0·7
June ..	+1·9	+2·0	+5·9	0	+2·0	+1·9
1956–57						
Sept. ..	+1·9	+3·1	+7·5	+1·0	+1·3	+2·2
Dec. ..	+0·9	+0·3	+1·7	+1·0	+1·3	+1·4
March ..	+0·9	−0·3	+0·3	0	−0·2	+0·2
June ..	+0·9	−0·8	+0·9	+1·0	+1·2	+0·4
1957–58						
Sept. ..	+0·5	+0·3	—	—	+0·3	—
Percentage change on preceding June						
June 1956	+4·7	+5·1	− 1·6	+2·5	+4·7	+5·6
June 1957	+4·7	+2·2	+10·3	+3·0	+3·6	+4·3

Retail Prices: Interim index of retail prices, all groups, excluding onions and potatoes (a).
Wholesale Prices: Wholesale price index: basic materials (total) (a).
Export Prices: Export price index: all groups (excluding gold) (a).
Import Prices: Import price index: all items (b).
Nominal Wage Rates: Nominal rates, adult males (a).
Average Weekly Earnings: Per male unit employed (c).

Sources: (a) Commonwealth Statistician, *Monthly Review of Business Statistics.*
(b) Commonwealth Bank, *Statistical Bulletin.*
(c) Commonwealth Statistician, *Monthly Bulletin of Employment Statistics.*

occasion, however, the "lag" of investment expenditure[25] is threatening to become indefinite. Despite the sharp rise in farm incomes, farm investment fell in 1956-7[26] and little improvement is so far evident.[27] The explanation would seem to be partly that the rise in farm incomes was confined to wool, but mainly that the first prolonged postwar drought in the eastern States made farmers and graziers understandably cautious. While drought fears inhibited the direct expenditure effects of the rise in farm incomes, central bank action restrained the indirect expansionary effects through the banking system (Table VIII).

One reason why a revival of inflationary pressure was expected in the latter part of 1956-7 was the enforced cut-back in market supplies

25. On the argument advanced in the *Economic Record,* April 1957, p. 108, no large rise in consumption expenditure could be expected to follow the rise in farm incomes.

26. Sir Arthur Fadden, *Budget Speech 1957-58,* p. 2.

27. Indirect evidence of tractor and fertilizer sales, and of commercial motor vehicle registrations in non-metropolitan areas, indicated some slight increase in rural investment in the first months of 1957-8

through the severe import restrictions imposed in 1955-6. The error here arose from a general underestimate of the extent of stock accumulation which had occurred out of the large 1955-6 inflow of imports. As Professor Karmel suspected, the preliminary 1955-6 White Paper figure of £70 million for the increase in the value of non-farm stocks, which suggested that no real investment had taken place, was an underestimate and has, in the 1956-7 White Paper, been revised to £110

TABLE VIII

London Funds and Bank Liquidity

Year and Quarter	London Funds		Bank Liquidity	
	Quarterly Average	Percentage Change on Corresponding Quarter of Preceding Year	LGS Ratio	Percentage Change on Corresponding Quarter of Preceding Year
	£m.	%	%	%
1955–56				
Sept.	386	−26·2	17·3	− 4·9
Dec.	363	−28·5	18·9	− 4·1
March	343	−29·8	21·7	− 6·5
June	342	−23·7	18·5	− 0·5
1956–57				
Sept.	355	− 8·0	19·5	+12·7
Dec.	400	+10·2	21·5	+13·8
March	474	+38·2	24·4	+12·4
June	556	+62·6	18·9	+ 2·2

Source: Commonwealth Bank, *Statistical Bulletin.*

million. This build-up during 1955-6 facilitated a run-down of non-farm stocks during 1956-7 of the order of £50 million[28] which largely offset the expansionary effect of import restrictions.

The preceding two points go a long way towards explaining why the favourable swing in the balance of payments did not produce the expected revival of inflationary pressures. They do not quite explain why the 1956-7 lull in business activity became as extensive and lasted as long as it did. The Treasurer, Sir Arthur Fadden, admitted in his budget speech that this has been puzzling official circles.[29] One answer no doubt is that the sharp disinflationary measures of March 1956, by contrast to the exhortations of September 1955, did have a marked psychological effect on the business world. But there may also be something in a point which has been made by business spokesmen: "A tremendous expansion in manufacturing capacity, production and efficiency has occurred (since 1951, physical output has increased by more

28. The preliminary White Paper estimate of the change in non-farm stocks in 1956-7 suggested no change in money value; the figure given in the text assumes a 4 per cent rise in prices and an aggregate value of stocks at the beginning of the year of £1,600 million.

29. "I hear it said that enterprise is hesitant about the future and needs a stimulus. This, frankly, is something I find it difficult to understand" (Sir Arthur Fadden, *Budget Speech 1957-58*, p. 2).

than one-half while employment has increased by one-tenth). . . . The official view was that shortages would develop, prices would rise. A realistic and informed view would have indicated that manufacturing industry was entering on an intensely competitive phase induced by rapid expansion of capacity."[30]

TABLE IX

Industrial Employment and Production

	Factory Employment		Industrial Production A.N.Z. Index 1948–49 = 100 (b)	Ratio (b)/(a)
	'000	Index 1948–49 = 100 (a)		
1948–49	890	100	100	1·00
1949–50	918	103	104	1·01
1950–51	969	109	116	1·06
1951–52	978	110	119	1·08
1952–53	933	105	113	1·08
1953–54	990	111	134	1·20
1954–55	1,031	116	143	1·23
1955–56	1,060	119	149	1·25

Sources: Employment: Commonwealth Statistician, *Production Bulletin* (factory census).
Production: Australia and New Zealand Bank, *Quarterly Review.*

Table IX, for what it is worth, suggests that this statement exaggerates the disparity between the growth of manufacturing output and employment.[31] But the last five years have undoubtedly seen a substantial increase in capacity and improvement in productivity in many Australian manufacturing industries. It is not unlikely that in some industries capacity had begun to outstrip demand and that this has contributed to the 1957 lull.

What, then, of the prospects for 1958?

It cannot be denied that there is scope for considerable expansion of economic activity in the coming year. During 1956-7, industry failed to absorb into employment the increase in the work force which must have amounted to about 2 per cent. Since the planned migration intake for the current financial year is only a little less than last year's,[32] a further 2 per cent is being added to the work force in 1957-8. Even allowing for the fact that the intensity of employment which obtained in 1955-6 could be regained only by a resurgence of inflation, it would be unfortunate if demand for labour did not increase suffi-

30. Australian Industries Development Association, *Director Reports,* No. 68, August, 1957, p. 3.

31. The statement may have been based on the employment series from payroll tax data which is now known to have considerably understated the growth of manufacturing employment over these years. Too much weight should not be given to Table IX. But the movement in the ratio corresponds reasonably well with similar data given by Maizels and Cheek in *Economic Record,* August 1957, pp. 171 and 207.

32. The Treasurer announced in his budget speech that the target gross intake of migrants for 1957-8 would be 115,000, the same absolute figure as the 1956-7 target (which in the event was exceeded by some 6,000) and therefore yielding a net intake of rather less than 1 per cent of the population.

ciently during 1958 to add at least 3 per cent to the present level of civilian employment. "There is also, we are told, some unused capacity in factories, construction plant and the like and, of course, new capacity is constantly being added. This extra capacity should also be brought into use."[33] The problem for economic policy makers in the coming months will be to assess whether economic forces are likely to achieve the desirable degree of expansion unaided, or whether they will need stimulus or restraint.

There are several reasons for expecting the tempo of economic activity to quicken during the next six months.

(a) In most fields of activity, some rise is, as we have seen, already under way—in housing and consumer durables, such as motor cars, since early 1957, in industrial production since the June quarter, in employment more recently.

(b) As recession gives way to renewed expansion, business is certain to aim at making good the run-down of stocks which occurred during 1956-7. If the volume of stocks is to keep up with a rising level of output and sales, real investment in non-farm stocks during 1957-8 could exceed the 1956-7 level by well over £100 million.

(c) Central bank policy, while keeping a restraining hand on monetary expansion, permitted a substantial increase in the liquidity of the public and (to a less extent) of the banks during 1956-7. Between June 1956 and June 1957, the volume of money in the hands of the public increased by almost 7 per cent (from £2,923 to £3,116 million). The trading banks' LGS ratio was only a little higher in June 1957 than in June 1956 (18·5 per cent as compared with 18 per cent), but it averaged 21·1 per cent during 1956-7 as compared with 19·1 per cent during 1955-6 and, because of the rise in deposits, the 1956-7 figures represented a significantly greater amount of liquid assets.[34] There was, in particular, a notable easing of finance for housing in the latter half of 1956-7.[35]

(d) The 1957-8 budget, though the concessions it granted disappointed the more hopeful taxpayers, was designed to give some stimulus to industry by a cut of 6d. in the £ in company taxation, an increase in allowances for depreciation and in exemptions from payroll tax, and by small reductions in sales tax on selected goods, market demand for which was known to be slack. In its overall effect on the economy, the budget appeared to aim, if anything, at restraint rather than expansion. It provided for increased expenditure (even allowing for higher prices) for Commonwealth public works, social security and grants to the States, totalling £80 million in money terms. But this provision was more than covered by buoyant estimates of revenue which, net of tax concessions granted, was expected to be £87 million higher than in 1956-7. The whole of the estimated budget surplus of

33. Sir Arthur Fadden, *Budget Speech 1957-58*, p. 1.
34. Commonwealth Bank, *Annual Report 1957*, p. 19.
35. *Ibid.*, p. 13.

£119 million was again appropriated to the Loan Consolidation and Investment Reserve; but of the £111 million appropriated last year, only £99 million was in the end required for support of the States' loan programme. Unless public support for new loan issues and conversions unexpectedly falls off in 1957-8, the net surplus should be larger than last year. Rightly or wrongly, however, the conservative character of the 1957-8 budget has been widely interpreted as being motivated less by economic than by political considerations—a desire to "hold enough in reserve" for a really "generous" pre-election budget in September 1958. The expectation of favours to come is in itself likely to raise business spirits.

These, then, to borrow stock exchange jargon, are the bull points in an assessment of economic prospects. Against them must be set three bear points.

(a) There are, as we have noted, soft spots in the economy which may have some effect in holding back a general expansion. One is the decline in non-residential construction. This need cause no trouble if adequate housing finance is available to take up the slack in building activity. Another is the damping effect of a continuing drought threat on rural production, income and investment. There are others which may worry particular industries but most of which, from an overall point of view, should be regarded as healthy signs of adjustment in the structure of industry.

(b) More important is the prospect of a substantially less favourable balance of payments than in 1956-7.

Table X summarizes the prospect as it appears at the time of writing. The estimate of export earnings assumes a wool clip equal to last year's record (this season's clip should not be much affected by drought), an average auction price of only 68d. a pound (the relatively low price at the time of writing; 1956-7 average 79·6d.) and a total wool export cheque of £450 million. On the assumption that drought will leave no exportable surplus of wheat beyond some £30 millions shipped from last year's carry-over, wheat exports are assumed to be down £52 million. Other rural exports are assumed to be on balance down a little; mineral ore exports down £5 million on account of lower prices; exports of metals and manufacturers down £7-10 million, mainly on account of domestic use (by the new B.H.P. tinplate mill) of steel exported last year. The estimate of imports exceeds the target of £775 million at which the relaxation of import restrictions of April 1957 was reported to have aimed; it takes into account the higher monthly figures for imports in the first quarter of 1957-8 and some further relaxation of restrictions in the second quarter. The increase in the invisible deficit assumed is smaller than last year, mainly because higher freights on larger imports may be offset by a smaller rise in profits due overseas. Capital inflow is very likely to be smaller, perhaps substantially smaller, if the experience of 1952-3 is any guide.

After the large rise in 1956-7, Australia's international reserves could stand the £100 million loss which would follow from the more

pessimistic assumption about capital inflow (and the perhaps unduly pessimistic assumption about the price of wool). At worst, hopes of further relaxation of import restrictions may have to be deferred until rains improve the prospects for rural exports. The importance of the

TABLE X

The Balance of Payments

(£ million)

	1956–57 actual	1957–58 estimate	Change estimate
Current Account			
Exports f.o.b.	980	845	−135
Other receipts for goods and services	166	175	+9
Total credits	1,146	1,020	−126
Imports f.o.b.	717	810	−93
Other payments for goods and services	349	380	−31
Total debits	1,066	1,190	−124
Current balance	+80	−170	−250
Capital Account			
Public and private borrowing	132	70−140	
Movement in international reserves	+212	−30 to −100	

Source: 1956-7: Commonwealth Statistician, *The Australian Balance of Payments 1952/53—1956/57.*

swing in the current account balance (— £250 million) lies rather in the deflationary effect on the domestic economy of a £100 million rise in imports and a £120 million fall in farm incomes; a substantial fall in capital inflow would operate in the same direction.

(c) Finally, the trend of overseas business conditions must, at this stage, be reckoned as a bear point for 1957-8. The drastic measures taken by the United Kingdom authorities in September to halt speculation against sterling, the re-emergence of dollar shortage, and the increasing signs of hesitation in American business activity, are all liable to exercise a damping influence on the Australian economy.

It might be best to let the reader draw his own inferences from this listing of points, both as regards short-term prospects and their implications for policy. A not unreasonable inference might be that the central bank should be prepared to ease monetary restraints quite markedly in the second half of the financial year unless expansion shows signs of accelerating unaided in the second quarter; and that, with the same proviso, there may be an honest economic as well as a devious political case for a rather more expansionary budget in September 1958.

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THE NEW ZEALAND ECONOMY 1956-7*

1. *Real Progress*

New Zealand continues to be very prosperous. Full employment is not threatened; there have been impressive increases in production. Wool production has reached a record level, and although butterfat and meat both fell, butterfat is not much below the 1952-3 peak, and the small decrease in meat is connected with a rise in the number of stock on hill country farms which are benefiting from aerial top-dressing and other improvements to pastures.

The volume of exports has also never been higher. There was, however, a deterioration in the terms of trade of 4 per cent. Partly as a result, the volume of imports fell by 6 per cent, but not enough to prevent further growth of factory employment and production.

In building, employment was more than maintained, and the number of houses completed was steady, although there was again a slight fall in the value of permits from the record of 1954-5.

The biggest gains of employment were in the service industries which, during the year ended April 1957, absorbed no less than three-quarters of the addition to the labour force. That is quite exceptional, but over the past ten years service industries have taken 74,500 new workers as compared with 31,200 for manufacturing and 23,800 for all remaining industries. In October 1956, moreover, service industries had 10,229 vacancies for labour out of a total of 18,594. The strongest demand has come from wholesale and retail trade, although significant increases have also been shown by education, road transport, the post office and hospitals.

On the whole, therefore, the rapidly growing labour force was absorbed without difficulty, and there was a general increase in the production of goods and services. There were, it is true, small decreases for butterfat and meat, for tobacco, woollen and leather manufacturers, and for private house-building; but there were special causes at work in each case, and they were too insignificant to depress the economy or even to end the overfull employment of labour.

2. *Aggregate Demand*

National income appears to have grown, both in money and in real terms, by the same amount as in the previous year. Nor was there any marked change in the distribution of income. There was some slackening in the rate of increase of salaries and wages, compensated by an increase in the income of the self-employed and in company profits. Although export prices fell, on the average by 1·8 per cent, the price

*I am indebted to Mr. A. D. Brownlie, of the staff of my Department, for checking statistics and for helpful comment on an earlier draft. I would also thank Messrs. A. R. Low and Mr. M. J. Moriarty for their private comments on this earlier draft. Full responsibility for the article, of course, rests with me.

TABLE I

Real Progress of the Economy 1953-7

	Unit	Absolute Figures				Annual Change			
		1953–54	1954–55	1955–56	1956–57	1953–54	1954–55	1955–56	1956–57
A. FARMING									
1. Employment[1] ..	thous.	134	136	137	137	1·0	1·3	1·0	0·0
2. Butterfat production ..	m.lbs.	501	509	533	527	−38	8	24	−6
3. Meat production ..	thous.tons	589	637	671	662	11	48	34	−9
4. Wool production ..	m. lbs.	426	455	462	488	8	29	7	26
5. Total farm production	1938–9 = 100	133	136	140	—	1	3	4	—
B. EXTERNAL TRADE									
1. Volume of exports[2] ..	1952 = 100	90	90	96	100	−10	0	6	4
2. Terms of trade[2] ..	1956 = 100	100	104	104	100	15	4	0	−4
3. Volume of imports[2]	1952 = 100	76	99	116	108	−24	23	17	−8
C. MANUFACTURING									
1. Employment[1] ..	thous.	194	199	200	203	7·0	4·6	1·3	2·7
2. Volume of production	1949–50 = 100	118	131	138	—	6·8	12·1	7·4	—
D. BUILDING									
1. Employment[1] ..	thous.	66	69	70	71	4·4	3·2	1·2	0·5
2. Permits issued ..	£m.	70	93	90	89	8·4	23·9	−3·2	−0·7
E. POWER, WATER, ETC.									
1. Employment[1] ..	thous.	12	12	12	12	0·1	0·2	0·0	0·3
2. Electricity distributed	1938–9 = 100	289	316	340	351	32	27	24	11
F. SERVICE INDUSTRIES									
1. Employment[1] ..	thous.	355	361	372	385	8·8	5·8	10·9	13·7
G. AGGREGATES									
1. Employment[1] ..	thous.	788	801	815	833	20·6	13·5	13·8	18·3
2. Material production ..	1938–9 = 100	152	164	170	—	5	12	6	—
Volume of goods available per head.. ..	1938–9 = 100	123	144	139	—	9	21	5	—

(1) As at April of latter year.
(2) Calendar year.

Source: Monthly Abstract of Statistics, August 1957.

support schemes for dairy produce and meat prevented a fall of farmers' incomes. Company profits, it may be noted, had fallen a little in the previous year, but fully recovered in 1956-7.

The most reliable figures on the expenditure side of the official estimates of national income are for the current and capital expenditures, on goods and services, by the central government. Current government expenditure was relatively steady but government capital expenditure increased from £66·5 millions to £72·4 millions, or from 6·8 to 7·1 per cent of gross national expenditure. There can, accordingly, be no doubt that the central government's real demands for goods and services rose appreciably during the year.

There was also some increase in local body capital expenditures. Private capital formation, however, decreased from £147 millions to £132 millions, or by just over one-tenth. This check is the most significant change in national expenditure. We should notice, however, that, owing to a quite recent revision to last year's official estimates, some decline of private investment is now also recorded for the previous year. In that year the increase of inventories slackened a little, and

TABLE II

National Income and Expenditure 1955-7

(£ millions)

	1954–55	1955–56	1956–57	Change		
				1954–55	1955–56	1956–57
1. Salaries and wages, etc. ..	443	480	508	47	37	28
2. Net owner-rentals	20	23	25	1	3	2
3. Other personal income from production	232	236	247	8	4	11
4. Company income	98	94	98	8	−4	4
5. National income	799	841	884	65	42	43
6. Gross national product ..	928	981	1,024	87	53	43
7. Personal consumption ..	612	648	672	75	36	24
8. Change in stocks	29	19	} 132	50	−10	} −15
9. Private fixed capital formation	130	128		26	−2	
10. Local body capital formation	23	26	29	2	3	3
11. Government consumption	114	125	136	0	11	11
12. Central government capital formation	59	67	72	1	8	5
13. Net overseas investment ..	−39	−32	−17	−67	7	15

Sources: 1957 Economic Survey, 1957 Budget and August Monthly Abstract of Statistics.

there was a slight drop in private fixed capital formation, most of which was associated with new dwellings. In 1956-7 there was a further slight decline in private building which brought it from the peak of £68·1 millions in 1954-5 to £64·7 millions in 1956-7.

But this would account for only £2 millions of the £15 millions decline in private investment last year. Some further decreases of stock probably occurred, pointers to which are a decline of approximately £1·5 million in butter stocks and of £4 millions in meat stocks, the fall in the annual rate of increase in retail stocks and the decrease of private imports by £8 millions. Part of this decline of imports, however, was connected with fixed capital formation because there were decreases in imports of base metals (£4·4 millions c.d.v.), machinery (£3·9 millions c.d.v.) and transport equipment (£1·5 millions c.d.v.).

Personal consumption is a residual in the estimates of national expenditure, and appears to have been increasing at a retarded rate during the past two years. Although not much reliance can be placed on that finding, it seems to be supported by the index of retail sales which increased by 2·9 per cent in 1955-6 but by only 1·8 per cent in 1956-7. Since retail prices rose last March year by 3·7 per cent, it would seem that there was an actual decline in the volume of retail trade, most marked in clothing, hardware and household appliances.

We conclude, therefore, that there was probably a small absolute decline in real private demands for goods and services last year, and perhaps more marked for capital expenditures than for consumption. But this decline, if real, was more than offset by the expansion of government spending, on both current and capital account.

3. *The Labour Market*

Statistics for labour give conflicting evidence about inflationary pressure during 1956-7. Notified vacancies for labour are no very reliable guide to the excess demand for labour, not only because some employers are careless or indifferent about notification, but also because there are theoretical reasons for distrusting any such measurement of the factor gap.[1] Nevertheless, surveyed vacancies did fall by 22 per cent in the year ended March 1957. They still greatly exceed the insignificant figures for unemployment, but there appears to have been some slackening in the demand for building tradesmen and textile workers. The official Economic Survey also considers that there is little excess demand for unskilled labour, especially in the northern districts of the North Island.

TABLE III

Labour, Wages and Prices, 1954-7

	1954	1955	1956	Latest
1. Unemployed(1)	58	56	259	613 (July)
2. Notified vacancies(1)	12,532	14,854	12,986	7,986 (July)
3. Rate of labour turnover (per cent)(2):				
a. males	19	21	20	17 (Oct.)
b. females	30	32	32	27 (Oct.)
4. Nominal adult male wage rate(1): ..	966	1,000	1,019	1,064 (June)
5. Average weekly payout(2)	950	1,000	1,045	1,110 (Apr.)
6. Import prices(1)	99	100	102	108 (Mar.)
7. Export prices(1)	99	100	98	100 (Mar.)
8. Consumer's prices(1)	976	1,000	1,035	1,056 (June)

(1) Average per calendar year.
(2) As at April.

Sources: Monthly Abstract of Statistics, August 1957, and Labour and Employment Gazette, May 1957.

A more reliable indication, perhaps, of a decreased demand for labour is the quite recent drop in rates of labour turnover for both male and female workers. For the year ended October 1956 these rates fell from 20 to 17 per cent for men and from 29 to 27 per cent for women. The Department of Labour regards these decreases as significant.

On the other hand, there is no evidence that overtime declined significantly, and wages have continued rising in real as well as in money terms. The official factory statistics show a steady increase of aggregate yearly overtime hours between 1952 and 1956; the weekly average for 1955-6 is 420,741 hours. This is almost the same as the overtime hours in manufacturing for a single week in April, 1957, given in a new survey by the Department of Labour. The two series are not comparable, and have a different time unit, but they seem to confirm a general impression that overtime has not suffered.

1. G. C. Archibald, "The Factor Gap and the Level of Wages", *The Economic Record*, November 1954.

The average minimum award rate for males rose by only 1·9 per cent during the calendar year, but by 5·4 per cent for the year ending March, 1957. That rise was the consequence of a general wage-order by the Court of Arbitration, and it is hard to say exactly how it affected actual wages. There is, unfortunately, no index of actual wage rates compiled in New Zealand. Until quite recently the only, and most imperfect, substitute has been a series of average weekly payouts covering all workers and both ordinary time and overtime hours. For what it is worth, however, this series indicates that wage disbursements rose at about the same rate as minimum wages during the March year. The official Economic Survey says that only a few employers do not appear to have passed on the increase, and a recent report of the Department of Labour says the Court's order was the principal factor in the increase of average wage payouts.

Wages, moreover, are the major influence on retail prices, and the consumers' price index rose by 2·8 per cent in the year ended June 1957 as compared with 2·5 per cent in the previous year. There are, of course, other influences here than wages. Food prices rose by 1·3 per cent largely because of increases in export prices of meat and fish, and housing costs by 6·1 per cent because of higher mortgage rates and some increases of rents. But if these special groups are removed, the rise in the index is unaffected.

Import prices, however, have a strong independent influence and they rose by 8 per cent during the March year, although by only 2 per cent during the calendar year. Time lags, of course, make the latter rise more significant for the increase of retail prices we are considering, and it appears that, as imports form only one-quarter of total primary inputs the rise in the consumers' price index must have been connected mainly with increased labour costs.

4. *External Markets*

Clearer evidence of weakness in demand appeared for exports. During the March year 1956-7 the volume of dairy exports fell by 7·4 per cent, butter prices by 17·3 per cent and cheese prices by 22·4 per cent. Export receipts from dairy produce thus fell by £6·1 millions in the March year, and by £18·4 millions for the year ended June, 1957.

Meat exports decreased by 3·6 per cent in volume and by 4·4 per cent in price; nevertheless, in the March year meat receipts hardly fell at all owing to the disposal of stocks worth some £4 millions. In the year ended June last, meat receipts actually rose by £2·8 millions, largely because of a recovery of prices, and reached a peak level of £74·4 millions.

Wool, however, is the brighest part of the export situation, the volume rising by 4·1 per cent in the March year, and prices by 15·8 per cent. Wool receipts did fall very slightly, because buyers were relying more heavily upon advances from New Zealand banks, but in the June year receipts increased from £94·1 millions to £106·6 millions.

TABLE IV

Net Overseas Exchange Transactions, 1954-7

(£ millions)

	March 1954–5	March 1955–6	March 1956–7	June 1955–6	June 1956–7
1. Exports	216.3	273·3	275·2	281·3	286·3
2. Other Receipts	50·5	37·9	45·8	38·3	44·6
3. Government payments ..	35·1	40·2	44·1	37·4	43·8
4. Private imports	232·1	242·1	234·3	238·6	238·3
5. Other payments	34·4	45·3	41·9	48·8	41·9
6. Balance of overseas transactions	−34·9	−16·4	0·8	−5·2	6·9
7. Current balance of payments	−39	−32	−17	—	—

Sources: 1957 Economic Survey and Reserve Bank Bulletin, July 1957.

There has also been an encouraging rise in receipts from other exports, by £8 millions. More than a third of this increase came from timber, pulp and paper, although higher receipts from milk by-products did a little to relieve the darkening situation of dairy farmers.

Capital inflows helped, too. In the March year government borrowing abroad rose from £3·2 millions to £9·7 millions, and private capital receipts are estimated to have risen from £6 millions to £10 millions. During the June year, however, government capital receipts rose by only £0·7 million and private capital receipts by only £0·9 million.

Notwithstanding these fluctuations, aggregate external receipts have not slipped back. During the March year they have risen by £45 millions, and during the June year by £46 millions. Their rate of increase has slowed down, but they have reached a record level.

A noticeable feature on the payments side is the increase of government demands for foreign exchange, an increase which has not faltered since 1954 and has now brought these demands to one-sixth of export receipts. A major factor here, of course, is the growth of public works expenditure and, to a lesser extent, defence expenditure. External interest on the public debt now absorbs only 1·2 per cent of export receipts.

Private imports are the largest type of external payment, and the one which the authorities are most anxious to keep under proper restraint. When they reached the excessive level of £232 millions, in 1954-5, our external account had a record deficit of £35 millions. This was halved in the following year, but only because a big rise in export receipts compensated for a further increase of private imports to £242 millions. During the last March year private imports fell a little to £234 millions, and this fall, together with increased receipts from minor exports and capital transactions, led to a bare surplus on exchange transactions. (National income estimates for the balance of payments showed a current deficit of £17 millions.) The fall in private imports, however, was brief. After September they began to revive, and since January have been running at record monthly levels. This, of course,

indicates a revival of inflationary pressure after what could have been no more than a very brief, as well as a very small, check in 1956-7.

5. *Fiscal Policy*

The Minister of Finance, the Hon. J. T. Watts, has made a number of speeches showing a sound appreciation of the dangers of inflation and of the need to hold down government as well as private spending. In the 1956 Budget he also took the rather bold step of increasing the overall rate of income tax by 12½ per cent by halving the rebate granted in the previous year.

Government finance, nevertheless, had an inflationary instead of a deflationary influence upon the economy in 1956-7. Current expenditure on goods and services, and expenditure on transfers and subsidies, both rose a little as percentages of national income. Current revenue, however, in spite of the higher income tax, fell slightly in relation to national income, so that government saving declined by more than £8 millions.

TABLE V

Government Finance, 1954-7

(£ millions)

	1954–55	1955–56	1956–57	Change		
				1954–55	1955–56	1956–57
1. Direct taxes	154·8	160·3	169·4	14·0	5·5	9·1
2. Indirect taxes	79·9	84·5	83·4	13·9	4·6	−1·1
3. Trading income	20·0	20·7	20·4	2·6	0·7	−0·3
4. Current revenue	254·8	265·5	273·3	30·6	10·7	7·8
5. Current expenditure on etc.	91·9	100·7	109·4	0·4	8·8	8·7
6. Transfers and subsidies ..	108·2	111·4	118·9	6·2	3·2	7·5
7. Revenue balance	54·7	53·4	45·1	24·0	−1·3	−8·3
8. Capital expenditure ..	58·8	66·5	72·4	1·4	7·7	5·9
9. External loans	11·6	−2·0	9·8	−0·8	−13·6	11·8
10. Overall cash surplus ..	18·0	−11·0	−3·8	—	—	—

Sources: Economic Survey 1957 and Budget 1957.

Capital expenditure also rose, both absolutely and in relation to gross national product. This increase may reflect the easing of private investment demands. M. J. Moriarty[2] has emphasized that government capital expenditure is not a strong instrument of stabilization but, being set at very high levels, is rather determined by the competition of the private sector for the resources available for capital formation. When, as last year, private demands ease, the government is better able to attract labour and have contracts completed.

This increase in capital expenditure was more than covered by an external loan of £5 millions raised in London, and one of £4·8 millions

2. M. J. Moriarty, Fiscal Policy in New Zealand, paper given to Dunedin Meeting of A.N.Z.A.A.S., January 1957.

from the United States Export-Import Bank. The savings drive launched in the previous year also helped, as small savings rose and contributed an extra £5 millions to government loans. Nevertheless, there was an overal cash deficit of £3·8 millions on all government transactions for the year.

The net contribution of fiscal policy was thus inflationary rather than deflationary. It is true that efforts were made to hold down expenditures as well as to increase income tax, and that without these efforts inflationary pressures would have been stronger. But it can hardly be maintained that fiscal policy overall was responsible for any positive check to private spending in 1956-7.

6. *Private Demand and Monetary Policy*

We have found difficulty in confirming the claim made in the official Economic Survey that there was a significant easing of general inflationary pressure during 1956. The best evidence for that claim is the reduction in vacancies for labour, the decrease in labour turnover, a constant volume of retail trade and a small decline in the volume of imports. Against that, however, it can be pointed out that there was still overfull employment, no apparent decline of overtime, and gains of real wages which made for much the same increase of retail prices as in the previous year.

There is, however, better evidence of some decline in private demands for goods and services. Personal consumption probably faltered very little, as it fell relatively to national income by only 1·0 per cent. But there was an unmistakable fall in private capital formation both in 1955-6 and 1956-7. Expenditure on private building declined by about £2 millions in each of these years, and the figures for permits suggest that these declines were associated mainly with urban housing as rural building seems to have been little affected and permits for commercial building have gone on increasing. Total private capital formation fell by £12 millions in 1955-6 and by £15 millions last year. There must, accordingly, have also been some fall in inventory formation or in producers' durables—probably in both.

The interesting question is how this check to private demand occurred. In view of our examination of fiscal policy we may dismiss that as a possible cause; government finance made for an aggravation, not a weakening of inflation in 1956-7. The only possibilities worth considering are uncertainties arising from the fall in dairy export realizations, as distinct from dairy farmers' income which actually rose because of price supports, and a restrictive monetary policy.

It has been the great achievement of the Reserve Bank to end the dangerous condition of elastic credit. Trading bank advances had risen swiftly in 1955, and in that year the Reserve Bank made a determined effort to check them by so raising statutory reserve requirements as to wipe out the trading banks' free cash. There was, accordingly, a small fall of advances from £184 millions in March 1955 to £178 millions in March 1956.

Last year the process went further, but the most significant change occurred in the first half of the year. Advances fell by £20 millions to £158 millions in the June quarter, and since then have been kept approximately steady. A new system of control, moreover, was introduced in June 1956; the Reserve Bank now notifies the trading banks of a target level for advances and adjusts reserve ratios so as to force them to borrow from it at 7 per cent if their advances exceed the target. The new system appears to be working smoothly, judging by the relative stability of advances and the comparatively unimportant borrowing from the Reserve Bank over recent months.

The reduction of advances in the first half of last year has led to some, but no very signficant, general decline of liquidity. The volume of money has been almost constant over the past three years and has fallen only from 36·3 to 34·6 per cent of gross national product. The main factor keeping up the supply of money in 1955-6 was a substantial shift from time to demand deposits, and in 1956-7 an increase of Reserve Bank advances to marketing agencies together with a small balance for overseas transactions.

TABLE VI

Monetary Changes, 1954-7

Date	Money Series		Retail Trade			Securities		Building Permits(1)	Private Imports
	Advances (excluding discounts)	Volume of Money	Credit Sales	Retail Trade	Retail Stocks	Long-term Yield on Stock	Share Prices		
	£m.	£m.	£m.	1953 =100	1953 1st qr. =100	p.c.	1955= 1000	£m.	£m.
1954 1st qr.	146	331	6·1	985	967	3·92	897	69.5	45.0
2nd qr.	146	312	6·9	1078	1003	4·01	956		49·2
3rd qr.	165	296	7·1	1067	1036	4·03	980		61·4
4th qr.	162	325	8·7	1249	1005	4·05	978		62·1
1955 1st qr.	184	346	7·0	1044	1036	4·13	974	93·4	59·5
2nd qr:	180	317	7·4	1115	1037	4·09	1004		59·5
3rd qr.	174	299	7·3	1112	1106	4·10	1009		61·9
4th qr.	170	324	8·3	1269	1088	4·38	1011		65·7
1956 1st qr.	178	356	7·1	1072	1086	4·60	1021	90·2	55·2
2nd qr.	158	321	7·2	1132	1084	4·63	1046		56·0
3rd qr.	155	302	7·3	1118	1129	4·73	1029		58·6
4th qr.	157	327	9·0	1301	1090	4·78	1035		59·9
1957 1st qr.	166	354	7·2	1105	1105	4·78	1058	89·4	59·8
2nd qr.	159	332		1184	1091	4·73	1151		60·0

(1) Annual figures.

Sources: Reserve Bank Bulletins and Monthly Abstracts of Statistics.

Our problem here is the extent to which, and the ways in which, this application of a restrictive monetary policy has checked aggregate demand; in particular its role in the overall reduction of private spending last year. Some light is thrown by the series assembled in Table VI, but we should first consider the types of advances that were most strongly affected by the credit squeeze.

The major reduction of advances occurred after December 1955 and in the first half of 1956, but to reduce seasonal complications we take changes in the June year. The total reduction of advances from June 1955 to June 1956 was £21.2 millions, and £18 millions is accounted for by the following declines: farmers £3·1 millions, private individuals £4·5 millions, finance companies £3·5 millions, retailers £3·9 millions, wholesalers £2·0 millions, and local authorities £1·0 million. During the next twelve months total advances fell by only £0·8 million, although there is some uncertainty here because of an intervening change in the classification of advances and a shift in date from the last to the second Wednesday of the month. It appears, however, that there was a further decline of £2·4 millions in advances to farmers, of £1·7 millions to retailers and of £0·5 million to private individuals.

The squeeze thus had its strongest effect upon farmers, especially dairy farmers, private individuals, finance companies, retailers and wholesalers. We should, therefore, expect that any check it gave to private demand would be most directly reflected in retail trade and building.

The statistics, however, do not show any absolute fall in retail sales or even in such part of these sales as were financed by credit. Nor do they show any fall in the value of retail stocks to suggest that pressure on retailers to repay advances forced significant liquidation of inventories. It can, of course, be said that all these series would have shown greater increases but for the credit squeeze, but they give no unambiguous support to the claim that monetary restriction reduced personal consumption expenditures.

It is more probable that the credit squeeze had something to do with the small decline of private building. But its influence in this connection could not have been very direct; for a decline of £0·8 millions in housing advances in 1956-7 was swamped by a previous increase of £2·8 millions in the housing loans of the State Advances Corporation. The tightening of liquidity, however, may have had something to do with increased requirements for owner's finance and with a rise in the interest on new mortgages from 4·76 to 5·09 per cent.

The largest decline of private spending was associated with business capital formation. This is also difficult to relate in any direct way to the credit squeeze as there was no significant decline in advances to manufacturers, and as merchants do not appear to have been hard enough pressed to reduce credit by liquidating stocks. Decreased advances to dairy farmers, however, may well be associated with a decline of nearly £1 million in rural housing permits, and with a smaller decrease in imports of farm machinery.

Nor is there, as one might well expect, any sign that monetary restriction led to such liquidations of shares and securities as would depress their prices. The share price index has gone on rising since 1954 and at June 1957 was 15 per cent higher than in 1955. There has, it is true, been a rise of more than ½ per cent in the yield on long-term

government stock, but some of that would probably have occurred in any case because of the growing attraction of investment in shares, and because of similar increases in Australia and Britain.

The official Economic Survey placed some emphasis on the decline of private imports as an indication that monetary policy had been effective in checking demand. It may be significant that the small decrease of private imports did occur in the first half of last year—when the main reduction of overdrafts was effected. But since then private imports have risen disconcertingly, in spite of advances remaining at a more or less constant level.

One other, and more general way, in which credit restriction could impose a check is by making employers more resistant to wage increases and less anxious to employ labour. It has appeared, however, that the margin of actual above award wages may have been maintained, there has been no apparent slackening of part-time employment, and there is no evidence of any general decrease of overtime. There are signs of a reduced rate of growth for overtime, just as there has been a substantial decrease in notified vacancies for labour, but it is, after all, incontestable that New Zealand still has overfull employment.

These considerations throw real doubt upon an actual curb to private spending from the credit squeeze. In my opinion, there could hardly have been any marked deflationary effect from the modest fall of advances at a time when there was still a high, and even excessive level of liquidity in the economy. Any effect, moreover, that monetary restriction might have had in the first half of 1956 was offset by the expansion of government spending later in the year.

The Reserve Bank, nevertheless, has done well to banish the idea that the supply of credit is elastic—more or less adjustable to demands for credit. Firm control of the level of advances must have a steadying effect upon the economy, even if it has not so far led to any significant reduction of inflationary pressure.

7. *The Outlook*

This is election year, when it is, of course, vain to look for any tightening of fiscal policy. The Budget has increased the combined expenditures of the Consolidated and Social Security Funds by £10 millions, and raised the capital programme by £5·3 millions. The rebate on income tax is to be restored and this, together with other tax concessions, is estimated to save taxpayers £13·2 millions. The capital programme, moreover, is not yet fully provided for, a small external loan having been mentioned in this connection.

It seems clear that fiscal operations must significantly add to inflationary pressure during the present financial year. Nor is it likely that the Reserve Bank will force any further reduction of overdrafts; the most we can expect is that it will prevent other than a seasonal increase of trading bank credit.

There are, unfortunately, already disturbing signs of renewed inflation. Retail sales rose sharply at mid-year, and the rise of private

imports continued unchecked. On present indications, payments for private imports could reach £250 to £260 millions for the year ending next March, and there may also be a small increase of government imports. It does not, therefore, seem unreasonable to anticipate an increase of £25 millions or more in our external payments.

It is more than doubtful whether export receipts will rise at the same rate. Wool prices have risen and, if they keep up, could add £15-£20 millions to wool receipts. Meat receipts might increase a little, although £5 millions would be an optimistic enough figure. But dairy receipts are perhaps more likely to fall than to rise; during the last June year they fell by over £18 millions or by nearly one-quarter. Even allowing for the maintenance of high receipts from other exports, it is conceivable that total export receipts will not increase by more than £10 to £15 millions, and that increase depends upon very favourable assumptions about wool prices.

There is, accordingly, a real danger of a substantial deficit in our external accounts for this financial year, perhaps of the order of £10 to £15 millions. It could, of course, be less if there is a greater net inflow on capital account, but the government did raise as much as £9·7 millions overseas last year and the recent Budget spoke only of the possibility of a small overseas loan. On the other hand, a wool credit of £5 millions is to be repaid by France.

External influences will also make for a further rise in the cost of living. Import prices have increased by nearly 8 per cent in the last March year, and renewed inflation in Britain together with a recent increase of 15 per cent in inward freights, are bound to lead to higher prices in New Zealand. There is, however, as yet no sign that the Federation of Labour will seek another general wage order this year.

Clearly enough there are difficulties ahead, particularly in regard to the balance of payments. The election has reduced fiscal policy to impotence and monetary policy has been neglected to the lesser role of preventing an expansion of credit as distinct from reducing it. At the moment the New Zealand economy is more than ever exposed to external influences and, even if things go as well as can be expected, is almost certain to suffer a fiscal deficit, a balance of payments deficit, and a further rise of internal price levels. Nevertheless, the economy will probably continue to make substantial net progress.

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BALANCE IN THE WORLD FOOD POSITION*

I have felt it a great privilege to be asked to give this lecture in memory of Gordon this year. I probably owe more to him than to any other member of the staff of this University. He and I understood one another so completely. We did so many different things together. We saw eye to eye on so many problems. And perhaps most important of all we, in our different ways, had the same happy relationship with the world outside the University in our respective spheres.

To both of us the application of knowledge gained by academic study and research to the problems of the world at large was quite as important as the gaining of new knowledge. I suppose many of our colleagues must have looked askance at some of the objects to which we devoted our spare time; but we were made that way.

I first met Gordon at an A.N.Z.A.A.S. meeting in Hobart in 1928. The Economic section had staged a discussion on the wheat situation and some of the Agriculturalists went across. He made some rather disparaging remarks about the wheat industry which brought forth a vigorous response from the late T. H. Bath of Western Australia who accused Gordon of "parading in his academic nightshirt". Giblin later poured oil on the troubled waters and it seemed that the wheat problem might not be so simple as it looked to some observers.

When Sir Harrison Moore, acting on behalf of the Institute of Pacific Relations, did me the honour of suggesting that I should write for Australia a book on Land Utilization in a series which was to cover all the countries of the Pacific Basin I agreed on condition that Gordon would be a partner. In this way I felt I should be saved from egregious errors on the economic side. Writing the book took much longer than we expected, partly because he took a year off in England, but largely because I was called away for two years on the Wheat Commission; years in which I learnt an enormous amount about our countryside in the course of the visits which the investigators paid to the various wheat farming districts of Australia. Sir Herbert Gepp, the Chairman, was wise enough to get Gordon to come in as a consultant at various stages.

In the work of the Rural Reconstruction Commission he was also most useful. Some of his comments on my draft chapters in certain of the reports were extremely pungent. He used to delight in pulling my clumsy style to pieces, and he did it in such a genial way that no one could have been put out about it.

We broadcasted together and were members of many of the same organizations. I admired his enormous energy and infinite patience in dealing with difficult situations, and his readiness to accept rebuffs which sometimes came from quarters from which one might have ex-

* The Gordon L. Wood Memorial Lecture, 1957.

pected help. I doubt whether his services as a link between the city and the University have been fully appreciated.

When considering what subject I might present to you this evening I was somewhat perplexed because, as many of you know, my economic knowledge is of a lowly order. Further, my interests are mainly concerned with that area of economic experience in which political interference and expediency often prevent economic forces from operating in the way in which one would expect.

I propose first to invite your attention to some of the factors which disturb the play of economic forces in regard to agricultural products and then to consider world supplies of food and other farm commodities and how they may be affected thereby in the future.

First: The Story of Farmers' Organizations.—Among the nations of the "Western World" the gradual development of farmers' organizations and their acquisition of political strength has been marked. Perhaps the United Kingdom is the outstanding example. In the 1920's her farmers growled and suffered economically. Control of their organizations was often dominated by men who, though farmers, also had very large business interests. Today the genuine farmer dominates these organizations and it is doubtful if any government can disregard with political safety the policy of the National Farmers Union. The result is a highly artificial price structure for many farm products and the expenditure of over £200m. sterling in subsidies of one form or another. The expenditure is on the internal trading account and does not upset the balance of payments. As long as the taxpayer provides the money the scheme can continue.

Other European countries have the same policy well entrenched in their political systems. Usually the home market is protected by tariffs and other devices and, in many countries, this goes so far as to stimulate production beyond the needs of that market and leave a surplus which has to be exported. French wheat is a case in point. The United States schemes have a different origin because they were mostly launched to stimulate production for export at the end of the war when world want seemed likely to be a prime cause of chaos, but their end result is similar.

Secondly: Home Production of Food for Security.—The experience of the war and the probability that in any future world outbreak overseas supplies would be even more difficult to obtain has made whole nations, especially Britain, aware of the importance of producing, even at some extra cost, a high proportion of food at home. The advantage of thereby assisting the balance of overseas payments is appreciated in some quarters. Whether those same sections realize that in reducing their purchases of food from overseas countries they may indirectly upset their favourable trade relations with their former suppliers, and thereby reduce their chances of selling manufactured products, is not

so certain. If they do not buy, they will surely be forced more and more to rely on price and quality to sell their goods. Arguments based on theories of multilateral trade, whatever their soundness may be, are not convincing to the majority of politicians faced with the problem of balancing an overseas trade account. Australia's relations with Britain on the one hand, and Japan on the other, are instances.

Thirdly: Increased National Independence in Former Dependencies and Elsewhere.—We now have many nations such as India, Pakistan, Ceylon, Indonesia and China with very dense populations all becoming politically conscious and seeking higher standards of living. Their farmers, in many cases, have holdings which are economically inefficient in size, and extremely difficult to operate effectively at a high standard of production. For them the only hope of improved standards lies in a very large measure of land reforms with some transference of labour to other occupations. The chances of this result being achieved in reasonable time, without vast political upheaval, others must judge. But their capacity to supply world markets with such products as they have exported in the past can scarcely be considered as reliable as it was before 1940.

In other parts of the world political independence has also been recently attained or is in process of being attained—Ghana, Malaya, the West Indies, the Philippines, Nigeria. Most of these countries are exporters of large volumes of agricultural products. In some the land problem is considerable, in others there are areas awaiting development. Whatever the position, these countries will need to buy many things from overseas. Trade is essential to their development, but unless the price of the export is maintained or improved there will be little sense in increasing its volume. The political future of these countries seems to me obscure, and political upheavals do not mean stability of production. The world has become so used, during the last half-century, to accepting these countries as reliable sources of its raw materials that the analysis of what would occur if those sources disappear or decline in volume will become a matter of significance.

At the moment Britain is handing most of these territories over in peaceful fashion to the newly constituted authorities. These in many cases are somewhat unaware of all the problems of walking alone. Unless these new governments can devise ways of providing continuously rising standards of living for the bulk of their peoples political dissension of a violent character is likely. Either they will have to abandon some at least of the principles of democracy or they will end with internal conditions which will militate against a continuity of exports. It may be that in so doing they will lower still further their living standards, but that is immaterial. During the youthful stage individuals are quite capable of standards of behaviour which are harmful to their healthy development. This is equally true of peoples, especially of those with low standards of education, and particularly in the modern world where skilful propaganda can be used to influence large numbers.

Synthetics and Substitutes.—The chemist must also accept a measure of responsibility for adding uncertainty to the food supply problem. He has provided substitutes which have in some cases reduced or endangered the markets for products which were once solely supplied by farmers.

One special point with regard to the competition between synthetic materials and "natural" products deserves emphasis. The capacity of a synthetic substance to oust a natural product depends on two factors —its relative price and its merits from the consumers' point of view. These are interrelated. The competition between margarine and butter in Britain was mainly in favour of butter except for some cooking purposes as long as the two were easily distinguishable in properties, despite the price differential in favour of margarine. When the margarine manufacturers were able to claim justly that their product had all the necessary vitamins and practically all the physicial properties of butter, it was difficult to prevent the removal of legal embargoes. Then the only remaining selling points for butter at its higher price were its snob value and the conservatism of many people. This has happened in all northern Europe, in the U.S.A. and now in Canada.

From the farmer's point of view synthetics are objectionable—they eat into his market and destroy its price structure.

The general world point of view is rather different. It is arguable that without the cellulosic synthetics a serious shortage in the world supply of apparel fibres could have developed during the inter-war period, because cotton production could not have expanded sufficiently rapidly to meet increased world demand. The depression masked this state of affairs by reducing purchasing power and leading to unsold stocks of the raw materials, especially of cotton, because the farmers had to go on producing.

It is doubtful if the world could have expanded its dairy industry to maintain the world's edible fat supply today, including as it does 2·8m. tons of margarine and 1m. tons of compound cooking fat. Incidentally, the world margarine supply probably could not have been maintained in balance with demand during the last decade had it not been for the invention of detergents which reduced the demand of soap on the supplies of vegetable oils and fats by over 300,000 tons.

A somewhat similar state of affairs has occurred in the rubber industry where about one third of total production is now of synthetics.

The trouble about the substitutes is that they often come on the market at a price which is so much below that of the natural product with which they compete. In the long-range position of world supplies of food and other farm products, we will almost certainly find synthetics playing an ever-increasing part and probably in directions scarcely contemplated at the present time.

Wool, which is outside the food group of commodities, provides another example of the importance of synthetics and is specially significant from Australia's point of view. In the inter-war period the com-

petition between wool and synthetics was in favour of the former because there was a marked quality difference between all the cellulose fibres and wool. The non-cellulosic types are, fortunately for us, more difficult to make and up to the present they still lack some of the qualities of wool; but some of the fabrics made from them are much closer to those made from wool than any of their predecessors. At present the manufacturers of these have no difficulty in selling their output, but many new factories are under construction and supply may overtake demand. If, when that happens, the purchasing power of the public should decline, many people could easily prefer the synthetic fibre garment to the woollen one despite the fact that the former lacks some of the qualities of the latter. Alternatively, government policy in some countries may force the people to buy clothing of the locally made synthetic fibres irrespective of its quality. I understand the Nazi government in Germany forced the use of wolstra as opposed to wool. It always seems unfortunate to me when my wool friends talk as if wool was unbeatable because the artificials lack *all* of its properties. At the moment the situation is unstable because, as I have said, the volume of non-cellulosic wool substitute fibres is less than 20 per cent of wool and their price is roughly comparable with that of wool on a clean-scoured basis. That this price is highly profitable to the manufacturers may be guessed from the fact that installations with an annual productive capacity of about 300 million pounds are under construction.

Potentialities for Increasing Production.—One further factor which may be significant in the supply position of farm products is the increase of the area of land used for farming and an increase in the efficiency of the methods of farming. We in Australia with our vast tracts of land which are today marginal for climatic reasons or because of the poverty of their soils, or for both reasons, are often unaware of the fact that most other countries are in the same position. The extent to which we can reasonably expect to control rainfall in the future is uncertain. The extent to which we could transfer land at present classified as permanent pasture into the arable class is considerable—provided we are prepared to make the necessary capital investment—which is large—and also pay a somewhat higher price for the products. In each continent areas exist where rainfall is reasonable but soil poverty keeps them unused, or in other cases swamps await drainage schemes which are death-traps until insect control has been established. Irrigation, which often increases the productivity of land tenfold, is capable of further expansion in many places, but it requires heavy capital expenditure and considerable skill.

As a matter of interest the figures of land use are worth quoting. World arable area is about 3,300 million acres and permanent pasture about 6,000 million, while the present irrigated acreage is of the order of 230 million acres of which Australia has rather less than one million at present.

Specific Commodities.—I will now turn to some of the chief classes of farm products entering international trade, examining them with regard to the factors which I have been discussing.

Cereals.—It seems reasonable to start with the cereals which are basic to human nutrition. Comparison of figures with those of the pre-war period must be carefully made because data from U.S.S.R. and its political satellites are uncertain and some countries which were completely independent in the 1930's are now behind the Iron Curtain. For instance, East Germany which was a main supplier for the rest of Germany before the war is now a separate entity. In all the statistics I quote I have taken, what some people would consider, gross liberties; omitting many smaller items, rounding off figures, and so on.

It is convenient to treat the cereals in two groups: Wheat, Rye, Barley and Oats which are mainly grown in cooler climates, and Rice, Maize and Millets which are typical of hotter conditions. The world production of the former group is of the order of 400 million tons and of the latter about 440 million. Of these vast amounts the greatest part is consumed in the countries of production. Of the production of the "colder groups" of grains about 8 per cent enters international commerce. Of the latter only about 3 per cent.

As everyone knows the present trade position of these grains, especially wheat, is overshadowed by very large surplus stocks which would have depressed prices to low levels had not credit facilities made available by national credit policies enabled the stocks to be financed. The cost to the farmer of that finance and of the storage facilities is greater than most people realize, but the marketing system has saved the smaller growers, especially in America, and has prevented that reduction of production which would have ultimately occurred in the exporting countries.

How long a period will elapse before either a couple of bad harvests in North America or some other catastrophe alters the situation is anybody's guess. Three points are worth noting. First, previous experience shows that if the surplus disappears and world prices rise then farmers will immediately increase acreage under crop and recreate the surplus. This follows because the surplus is such a small proportion of *total* production and because transport is easily organized. Secondly, the International Wheat Agreement as at present framed is of little use in dealing with the surplus because the negotiators for the sellers, who largely set the world price schedules, have to take into account the price which will meet the needs of their less efficient producers as well as those of the larger and more effective growers. So the lower limit of price range is ineffective in reducing production. Thirdly, the world surplus of wheat, about 45 million tons, is of the order of one year's volume of trade in that grain and only about 15 per cent of total production.

From this last point it follows that without an increase in acreage sown and if there were no increased efficiency in production the problem would disappear in a few years owing to increases in population.

The position of the cereals of summer regions is somewhat different. International trade in both rice and maize are smaller than before the war. Rice trade has been to some extent replaced by wheat, but increased production in India is a main factor. It is commonplace to refer to the vast increases in population which are impending in these Asian countries. Their capacity to increase food production proportionately is less often referred to. In India an increased use of nitrogeneous fertilizers and the adoption of more careful husbandry could bring about a considerable increase of production—probably of the order of 25 per cent. Large new irrigation schemes are also being developed. When the rural landholders have been educated up to a sufficient level to approve of farm consolidation and the suppression of sacred cows, further improvement will become practicable.

In most other Asian countries modern scientific knowledge could increase farm output very considerably. Japanese agriculture is probably the most advanced technically at the moment.

Sugar is probably the most political of all crops. The cultivation of sugar beet is so suited to the peasant farmer with surplus family labour that it was essential to maintain it as a rural industry. The production of cane is usually a matter of interest to large commercial enterprises which process the crop. Further, the cultivation and harvesting of the crop requires much labour. Low prices for export sugar are usually associated with unrest in such countries as Cuba or Haiti. International agreements controlling production operated more or less successfully before the war and have been reinstated since. Of special interest to Australia is the British Commonwealth Sugar Agreement under which the importers—Britain, Canada, New Zealand—agreed to take specific quotas from the Commonwealth Exporters. Of these the chief are B.W.I., Australia, Mauritius, South Africa, Fiji, British Honduras and B.E. Africa. The price is fixed by negotiation and by such tariff concessions as are current.

The source of world exports of sugar is of interest. Cuba is in a dominant position, shipping about 4 million tons of which the U.S. takes a large amount by agreement, thus leaving about two million of "free" sugar to come under the international agreement. Hawaiian export also goes to U.S.A. The Republic of Dominica and Formosa with 600,000 tons come next on the list of "free" exporters. Czechoslovakia, Poland, the U.S.S.R. and Peru are not in the international agreement. Of the total world production of about 36 million tons of raw sugar about a third enters the export trade. Of this 12 million tons 2·5m. is British Commonwealth trade and 3·2m. goes to the U.S.A.

The relation between supply, demand and price is interesting. The dominant position of Cuba was illustrated by the year 1956 when a bad season and some internal disturbance in that island reduced the volume of "free" sugar available. World price reacted sharply within a few weeks. It seems that although there is normally a surplus and the need for export quotas, a 10 per cent decline in the amount on the free market, which could easily occur if two or more of the major suppliers

were eliminated, would have marked results. Britain as chief importer is clearly at an advantage in having some security of supply from Commonwealth sources, although the cost of obtaining it through tariff concessions has to be considered. The agreement looks like a partial insurance policy.

Edible oils and fats offer an extremely interesting study. The raw materials from which they are drawn are widely varied, the largest group coming from fruits or seeds of plants. In addition there are animal residues such as lard, derived from overfat pigs, and all sorts of residual fats from the meat trades including offals. The third group is from whales and other fish industries.

Not only are the origins various, the uses are equally so. Margarine seems to absorb about 2·3 million tons yearly; compound cooking fats of commerce account for 1·2 million and soap takes a further 2·6 million. Large quantities of dripping and special oils, such as olive, are used in cooking or eaten directly. Various industries absorb smaller quantities.

These figures are rough approximations and are those for the fats used in the manufacture of the products I have mentioned. Margarine is (very roughly) 80 per cent fat, and soap (still more roughly) 60 per cent.

The fats used in making margarine and soap, coming from a wide variety of sources, are blended together and the proportions of each depend, to a considerable extent, on the availability of a particular oil or fat in the markets open to the manufacturer at the time. For instance, soya-beans and cotton are both grown as important crops in the U.S.A. The oils from their seed form the largest part of the vegetable oil supplies in that country. Soya-bean oil is not now of great importance in the United Kingdom, peanuts and palm kernels grown in the British Commonwealth being the types most used in that country.

The total world production of oil seeds is best expressed in terms of oil rather than of seeds themselves because the percentage of oil varies from one type to another. However, it is of some interest to know that the total of vegetable oilseeds grown, including those mainly grown for industrial purposes, is of the order of 73 million tons annually, about three-quarters of which is used for food in one form or another. The distribution of this total is (in approximate order of importance) Coconut, Palmkernels, Groundnuts, Linseed, Soya-beans, Cotton Seed, Sunflower, Rapeseed and Sesamum.

Turning these into oil, the international trade figures are (very roughly)—

Coconut	1,200,000 tons
Palm	950,000 „
Groundnuts (peanuts)	750,000 „
Linseed	450,000 „
Soya-beans	400,000 „
Cottonseed	350,000 „

plus a large number of others, making a total of about 4·5 million tons.

The great proportion of many of the oils is used in the country of origin. I have already referred to the home consumption of soya and cotton-seed oils in the U.S.A. Rapeseed and Sesamum are grown largely for local use in India and other Asian countries. Sunflower is widely grown but its chief centres are behind the Iron Curtain.

Although the international trade of many of the seeds is only a fraction of total production this is the important section from the point of view of Britain and other countries relying on these seeds for their oils for margarine, soap and other uses. This being the case, the geographic analysis of the production is specially important if there are any doubts about the security of future supplies.[1]

Copra, the marketable part of the coconut, was first on the list with about 1·2 million tons (oil equivalent) of exports.

Main Exporters		Main Importers	
Philippines	550	U.S.A.	248
Indonesia	200	Germany	212
Ceylon	120	U.K.	87
New Guinea	60	India	63
Malaya	50	France	59
Mozambique	30	Netherlands	41
Fiji	20	Sweden	39
		(Australia	20)

Palm Kernels and Palm Oil.—These come from varieties of the same species (*Elaeis guineensis*). Some of them have a thick fruit cover containing oil, in others the cover is thin and almost all the oil is in the seeds. The seeds can be shipped, but the other varieties must be crushed in the country of origin and the oil extracted there before shipment. The oils from the seed and from the coat are somewhat different, but they are used for the same purposes.

The palm is indigenous to W. Africa, where it is handled by small producers who operate co-operatively. In Malaya and Indonesia it is a plantation crop.

Exports amounted to 950,000 tons (oil equivalent).

Main Exporters		Main Importers	
Nigeria	380	U.S.A.	40
Belgian Congo	210	Germany	120
French West African Territories	75	U.K.	340
Indonesia	140	France	90
Malaya	55	Netherlands	120
Sierra Leone	27	Belgium	60

Peanut Oil (750,000 tons)

Main Exporters		Main Importers	
Nigeria	200	U.K.	170
India	170	France	200
French West Africa	150	Belgium	30
China	100	Germany	70
		U.S.A.	36
		Netherlands	18

1. Figures in following tables are in thousands of tons.

Linseed (450,000 tons). This is mainly an industrial oil.

Main Exporters		Main Importers	
Argentina	200 oil eq.	U.K.	110
U.S.A.	100	Germany	85
Canada	80	France	50
India	50	Italy	40
Uruquay	30	Netherlands	30
		Australia	15
		Japan	20

Soya-bean (400,000 tons). This is the staple crop of Manchuria.

Main Exporters		Main Importers	
U.S.A.	300	Japan	110
China	100	Germany	85
Brazil	5	Canada	30
		Netherlands	25
		Denmark	10

Cotton Seed Oil (350,000 tons).

Exporters		Importers	
U.S.A.	250	U.K.	50
Sudan	22	Germany	80
Nigeria	10	Netherlands	25
Nicaragua	12	Japan	10

If the main exporting countries are grouped, irrespective of the type of vegetable oil, some countries and regions are only exporters—

	Exports
British and French West Africa and Congo	1,055
Philippines	550
Malaya	105
Indonesia	340
China	200
Argentine	200
Ceylon	120

some are both exporters and importers—

	Exports	Imports
U.S.A.	650	330
India	220	60
Canada	80	30

some are net importers—

	Imports	
U.K.	760	
Germany	650	1,480
France	400	
Netherlands	240	
Belgium	110	
Sweden	40	
Italy	40	
Japan	140	
Australia	35	

If supplies which we at present regard as normal were disturbed, it is to be expected that supplies from U.S.A. would mostly be retained. Normally, stocks are not large and prices would react sharply. The African supplies mostly cost about six times pre-war levels. The coun-

tries of Western Europe, which acquire about half the imports, and U.K. which takes another quarter of them, might easily be squeezed, especially as India and Ceylon will probably have smaller volumes available for export. The 2·8 million tons of margarine might cost more and so give more competitive power to 3 million tons of butter which the world produces.

The world edible fat position may be summed up in the following points—

1. As long as the supplies of vegetable oils and fats are maintained in balance with demand, margarine will continually oust butter.
2. At the moment world butter supply is at about 3·0 million tons and world margarine 2·8 million tons.
3. Of the butter only 0·46 million tons (= about 15 per cent) is exported, the rest is an internal affair.
4. This has to be compared not with margarine exported but with margarine's share of the world's annual trade in vegetable oils and fats.
5. If a major region of vegetable oils went out of world trade owing to political or social unrest, the balance would be upset and margarine price would rise.
6. A wider use of detergents in lieu of soap would act in the opposite direction.
7. World prices of most vegetable oils are about six times pre-war levels. This seems a high ratio, but the pre-war rates provided a standard of living and social services which was causing grave disquiet in W. Africa and elsewhere. Probably the pre-war price would not have continued. If we assume for the sake of argument a factor of 3 for the general inflation of prices then, although it looks at first sight as if the native cultivator was twice as well off as before the war, yet even this may not mean much of a standard today.
8. Whatever the standard is today it will still have to rise in a new democracy whose leaders will inevitably be judged by the results which their policies produce in terms of this very standard.
9. In my opinion the competitive position of butter in ten years' time will be better than it is today.
10. If this is not to happen, political developments in Africa, the Philippines, and Indonesia will have to be orderly and the governments of those countries will have to increase the volumes of supply of oil seeds.

Meat.—The last commodity to which I shall refer is meat. To some extent meats are interchangeable, but popular habits and preferences vary widely. The annual output of meat, excluding poultry, goat meat and fish, in the main producing countries is about 30 million tons, of which pig meats contribute about a third, beef and veal over a half

and mutton and lamb about 5 per cent. You will of course realize that "beef" includes a wide category of types, from young animals carefully fed all their short lives, to larger, matured, toothsome and tougher bullocks and finally the old ladies who have for years taken their places twice daily in the milking sheds on dairy farms.

The same caution is somewhat necessary with "mutton" which includes young grown sheep, well fed for the trade for one or two years, also old ewes who have had four or five lambs and finally wethers which have produced five or more cuts of wool.

Pigs differ from the other types of meat animals in that their numbers can be increased far more rapidly, since a well-managed sow will produce two litters a year of up to 10 piglets each. The pig is also specially suitable for the small peasant farm because it is a voracious and omnivorous feeder and requires very little space. It can therefore be used as a means of turning farm or city waste into meat. It will not do this quickly, but if fed in this way it is cheap to run and requires relatively little labour. Naturally, therefore, the pig is popular in countries with peasant systems of agriculture, except where religious taboos prevent its acceptance. In the United States it has long been used as a method of converting vast crops of maize into a commodity which can walk off the farm.

One other point in considering meat is the fact that it is not essential to the maintenance of human life. Cereals are virtually an essential. Sugar in one form or another is regarded as an integral part of diet by most people, except the unfortunates whose health does not allow them to eat it. Fats are an essential constituent of food if health is to be maintained. But millions of people are vegetarians and other millions get most of their high grade protein from poultry or fish, which scarcely come in the category of meat as I am using it.

Of the 30 million tons of meat which seems to be a rough estimate of the world's annual animal production, less than two million tons enter export trade. The remainder is consumed in the countries of origin. Of that two million, very roughly two-thirds goes to the United Kingdom. So Britain is vitally concerned in the international trade in meat, and the security of its supplies. This situation requires some separate analysis for each type of meat.

In the case of *beef*, pre-war supplies were of the order of three-quarters of a million tons, of which the Argentine and Uruguay provided two-thirds between them: Australia and New Zealand about 23 per cent, Brazil 5 per cent, Denmark 1 per cent.

The war interrupted the trade and altered political and economic conditions in South America and especially in the Argentine, where local consumption increased. By 1954 some recovery in export supplies had taken place, but world exports were still little more than 0·5 million tons (a decline of about 0·25 million tons) of which the Argentine and Uruguay now provided only about 0·15 million tons (a decline of 70 per cent). Brazil's exports were small, Australia and New Zealand were producing 0·17 million tons which was more than the South

American Republics. Eire, Denmark and France increased their exports to about 0·05 million tons each. The Argentine then changed its internal policy towards farming interests and towards international trade. In 1956 her exports rose to about 250,000 tons. This produced a considerable reaction in the London price. Meanwhile, reports from Argentine suggest that political unrest is increasing and also that the export rate of 1956 could not be maintained. There can be no doubt that increased technical skill in the managing of pastures and the organization of production could lead to a gradual increase of production of very large dimensions, but whether political forces will permit, stimulate, or hamper the process is anybody's guess.

International trade in *pig meats*—pork, bacon and hams—before the war ran at about 0·5 million tons: by 1955 they had recovered to that level. The United Kingdom is still the largest importer—almost the only importer of cured pig meat. Denmark is by far the largest exporter. Netherlands and Poland are the only others of note. Canada still has some trade in frozen pork.

Sheepmeats.—World trade in mutton and lamb was 348,000 tons pre-war; by 1955 it had reached 404,000. New Zealand accounts for two-thirds of the total. Argentina is now second with 70,000 tons, while Australian exports have declined from 97,000 to under 60,000, largely owing to the fact that we have been increasing flocks at the rate of about 6 million a year—if turned into mutton they could have represented 150,000 tons of meat.

The following table shows the chief countries of export, by types, for 1955—

EXPORTS OF MEAT

('000 tons)

	Beef & Veal	Mutton & Lamb	Pork	Canned	Total
Australia	146	56	2	57	261
New Zealand	94	267	9	10	380
Argentine	191	70	4	85	350
Uruguay	4	—	—	6	10
Denmark	41	—	276	49	366
Netherlands	11	5	72	48	136
Eire	17	4	11	14	46
France	51	—	12	14	77
Poland	—	—	40	16	56
U.S.A.	16	—	27	6	49
Canada	4	—	28	7	39

Danish pigmeats are largely dependent on imported grain and, although supplies of this seem secure for some years, they may not remain so. The Argentine and other South American republics are somewhat unreliable sources of supply, especially as the former has greatly reduced her overseas interest bill, although like Australia she is in need of capital to develop her oilfields and industries. Confronted with this situation, it is not surprising that Britain was prepared to come to a long-term meat agreement with Australia. The Argentine recovery in export in 1956-7 depressed prices to such an extent that £3 million has been paid by Britain to our beef-growers in subsidies.

I have said nothing about plantation crops such as tea, coffee, cocoa and the spices. These are nearly all in tropical countries, most of which are now independent. Their reliability as sources of supply varies considerably. But such things, although pleasant, are not vital to human existence—and probably the chemist could provide equal flavours synthetically if he tried hard enough.

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SOME RECENT ADVANCES IN STATISTICS

1. *Introduction*

Any statistical analysis contains a subjective element whose effect on the analysis depends upon the skill and experience of the statistician. In time series analysis the subjective element is greater than in the classical part of statistics (which is largely concerned with the analysis of experimental data) because of the much greater range of possible models of reality. In applications of time series analysis to economic data the subjective element is further increased by the great complexity of economic phenomena and the difficulties of measurement. The statistical analyst (unless he is that rare combination of an experienced and highly trained statistician and an experienced and highly trained economist) will therefore have to collaborate closely with the economist. The collaboration will, of course, be made easier if each partner knows something about the other's subject. It is the purpose of this article to tell the economist something about the new results in the analysis of time series which have been obtained in recent years. No attempt will be made, in general, to give such a detailed and elementary description of these techniques that an economist with only a moderate knowledge of statistics could himself apply them.

Most of the results discussed below have been obtained since 1949 (when the last review of this kind was published in this journal[1]) but in order to give a connected account it will be necessary to refer to earlier results also.

We shall begin with the simplest situation and then elaborate. Needless to say the simplest situation is also the least real. In fact it is difficult to imagine economic data fitting precisely any model upon which an exact statistical analysis could, at present, be founded. We shall not continually make apologies, however, for this lack of reality. After all a certain willingness to compromise with reality is an essential feature of any research.

2. *Stochastic Processes*

By a time series we mean a single series of observations made at equidistant points of time (or covering equal, successive, intervals of time). We shall represent the series of observations by

$$x_1, x_2, \ldots, x_n \tag{1}$$

and we shall use x_t to indicate a representative element from it. Many economic observations come in this form, of course.

The analysis of such a series into simple constituents can be approached in a more or less empirical spirit. Some prior theory must always precede measurement but in some cases so little is admitted that the analyst is forced to use very primitive statistical devices (such as the measurement of the average distance between peaks in the graph

1. D. Cochrane, *Economic Record*, Part II, 1949, p. 7.

of the series). On the other hand one may be prepared to admit a very considerable prior theory which will embed the series in an elaborate model of the economy involving a large number of other series. Throughout this article we shall be considering a variety of situations in which different amounts of prior theory are admitted but where, in every case, enough is said *a priori* about the nature of the series to allow some fairly advanced statistical devices to be used.

To begin with we cast aside the possibility of completely explaining the series in a deterministic way. By that we mean that no matter how long the record is (how large n in (1) is) we do not believe that a law is discoverable which will allow the future to be predicted with absolute certainty. Instead we insist upon the necessity of incorporating stochastic (i.e. random, chance) elements into the explanation. That is, we regard the series as having been generated by a "stochastic process".[2] The stochastic process can be thought of either as the mechanism (incorporating chance elements) which grinds out the observations we have or (and this will be seen to be the same thing) as the assembly of all possible series of observations which would be generated by the mechanism if history repeated itself again and again with only the chance elements varying according to their own probability laws (as the results of successive throws of a die will vary though the ritual of throwing be reproduced as perfectly as possible at each throw).

But the manifold of all stochastic processes, out of which we have to choose one as the generator of our series, is so large (being equivalent to almost all observable phenomena) that we must use prior knowledge to restrict it further before we are able to make a useful choice. The first restriction is based on the division of processes into those which are stationary and those which are evolutive. For a process to be stationary it must possess no trends. There must, for example, be no tendency for the values observed to increase steadily over the period of observation (this feature not being a chance occurrence in our particular set of observations which would not be found if history repeated itself). Similarly a trend in the tendency to fluctuate so that oscillations are wider later in the series than earlier will prevent the process from being called stationary as will also any change through time in the degree of association between successive observations or observations two, three, and so on, periods apart.[3] Processes which are not stationary are called evolutive. In Australia at present in particular, it is clear that most economic series will be evolving with the growth of population, knowledge and capital. The range of evolutive processes for which statistical treatments have been studied is small and all treatments suitable for economic data are based on the assumption that the evolutive element can be removed by some fairly simple device such as

2. This term has now become so generally used that we must retain it, even at the risk of the accusation of pretension.

3. An exact definition of stationarity will be found in J. L. Doob, *Stochastic Processes* (New York, 1953).

the subtraction of a trend. Such a procedure affects the later analysis and itself needs study, but we shall consider this later and for the moment shall presume that the series is in, or has been brought to, a stationary form. (For example a series might have been deflated by division by indices of prices and population and in this form it might seem reasonable to say that it was stationary.)

The economist will be familiar with a large amount of work which has been done, by people who make no use of what is usually regarded as the theory of stochastic processes, on the problem of analysing a series into simpler components.[4] These workers use terms such as trend and cycle, but usually after defining them in a rather vague way. For example a trend may be defined as "the general drift of the series" with the "detours" disregarded. These definitions are usually surrounded by a considerable discussion of the ideas and it must be recognized that the apparent looseness of the definition may be largely removed in practice by the degree of knowledge of economic life of the worker who has few doubts as to what his interpretation should be in relation to a given series.

The definition based on the concept of stationariness is precise. The difficulty is of course that no reasonable person could believe that the stationary and evolutive elements can be separated except as an approximation, so that it is too precise. Growth and variation around the line of growth will be inextricably intertwined. Consider for example an index of stock exchange prices. Over a long period this index will display a trend which could be estimated by fairly elementary statistical techniques (to be discussed below) and the estimated trend could be subtracted from the original series. However, it seems quite unlikely that the residual series would be stationary, for willingness to "play" the market on the part of investors will almost certainly vary with the trend (being greater, say, in periods of rising trend than in periods of relative stability) so that the day to day fluctuations about the trend would vary in amplitude with the state of the trend. The mere subtraction of an estimate of the trend might not therefore leave the series even approximately stationary. Other devices (such as division of the residual after trend removal by an indicator of the rate of change of the trend) might result in a reasonable approximation to a stationary series. If after isolating an approximately stationary component by such means, one then chooses a stochastic process as the generator of this stationary component one has of course to add back to this stochastic process the *non*-stationary component (for example by multiplying by indices of prices and population) to get the corresponding estimate of the whole process, corresponding to what one thinks of as the economic process. As we have just said such an end result is to be regarded as an indicator of what one should look for in seeking a suitable model of the economic process rather than as itself a realistic model of that economic process.

4. See W. Fellner, *Trends and Cycles in Economic Activity* (New York, 1951), Chapters 1 and 2.

The answer of the *non*-statistical economist to this problem is to make the assumption of a simple decomposition but to make his definitions loosely and to admit a large subjective element into the analysis with a resulting use of rather primitive techniques. Until our knowledge of economics is sufficiently precise to allow a division of the possible range of processes into useful subclasses in some other way any statistical analysis of economic data which attempts to use advanced techniques will, however, have to depend on the division of processes based on stationariness.

The analysis of the series will now be considered in two stages, the first of which is designed further to narrow down the range of (stationary) processes and the second, to extract a particular process from the range chosen.

3. *The Spectral Density*

If little prior theory is admitted into the analysis, as will be the case with the methods to be considered in this section, one is faced with the problem of discriminating among a large range of possible models of reality and to make any very useful discrimination one will need a large amount of information. This means that, compared with situations where prior theory of the workings of the system is extensively used to narrow the range of possible models, the number of observations will need to be large. It would hardly be worthwhile applying the techniques of this section to series, of the type often met in economics, consisting only of 30 or so terms. Only series which can reasonably be regarded as homogeneous over a considerable period will provide sufficient observations.

In the choice of the class of stationary processes to be further considered two principal devices are used. The nature of a stationary process can be (largely) summed up by describing the degree of dependence between observations at time t and $t + j$ (for every j). It should be noted that the degree of this dependence, for a given lag j, does not depend upon t, by reason of the stationarity assumption. This association is measured by the jth serial correlation coefficient, defined by

$$r_j = \frac{n \sum_{t=j}^{n-j} (x_t - x)(x_{t+j} - \bar{x})}{(n-j) \sum_{t=1}^{n} (x_t - \bar{x})^2} \tag{2}$$

Here $\bar{x} = n^{-1} \Sigma x_t$. This statistic (i.e. number computed from the observations to hand) is regarded as an estimator of a "true" measure of association between x_t and x_{t+j} to which it would tend if the number of observations, n, could be indefinitely increased.

The plotting of these rj (against j) and the examination of the resulting diagram (the correlogram) was described in some detail in an article by Professor Rutherford.[5] We shall not deal with it further here since developments since 1948 have been of a minor nature.

5. *Economic Record*, 1948, p. 58.

We have said that the nature of a stationary process can be (largely) summed up by describing the nature of the dependence between observations j periods apart. One must be careful in interpreting this statement. To begin with, it is applied to stationary processes. Secondly, the process may be the resultant of a large number of relations involving a large number of variables and on that account may have a lower degree of autonomy, as the preservation of the process into the future will depend upon all of these relations continuing to hold. Finally, it neglects the relationship between different variables. For example, we might have two economic variables x_t and y_t connected with each other and two random unpredictable disturbances ϵ_t and η_t by relations (having a natural economic content) of the form

$$x_t = a\,x_{t-1} + b\,y_t + \epsilon_t$$
$$y_t = c\,y_{t-1} + \eta_t$$

These two can be transformed into the equivalent set,

$$x_t = (a-c)\,x_{t-1} + ac\,x_{t-2} + b\,\eta_t + \epsilon_t - c\,\epsilon_{t-1}$$
$$y_t = c\,y_{t-1} + \eta_t\,,$$

in each of which only one economic variable occurs. One can validly say that the first relation determines, with the ϵ_t and η_t, the whole history of x_t, but the study of x_t alone and the eliciting of this relation, even exactly (which is impossible) would not give us as much information as the study of the two series x_t and y_t together would give. Moreover, even the derivation, exactly, of both relations in the second set might not be entirely satisfactory unless we have the underlying *a priori* theory which enables us to move back to the first sets for the first relation in the second set is a combination of both relations of the first set and will only hold if both of these hold, while the first set might represent very fundamental features of the true state of things.

Nevertheless, one can conceive of a situation where the knowledge required for the construction of the first set, or the choice of y_t as a variable related to x_t, did not exist (or the worker was unwilling to make prior guesses). In this situation the examination of the process generating x_t by itself, the resultant of two relations, could be a first step in the building up of a more satisfactory theory. It is not difficult to see that this process can be specified by specifying the relation between x_t and x_{t+j} for every j.

There is however an alternative to the study of the relation between x_t and x_{t+j} which, while theoretically equivalent to it, may result in a description of the process which is nearer, in some cases, to what is being sought.

As we have previously indicated, the natural approach of the economist to the analysis of a series would probably be an attempt to break up the fluctuations into "cycles" of various types. For example Burns and Mitchell[6] are concerned with a number of economic series

6. A. F. Burns and W. C. Mitchell, *Measuring Business Cycles* (New York, 1946).

from which they have removed the seasonal variation and they have deliberately used techniques which are very insensitive to the existence of trends. They are then concerned with the analysis of cycles in the series. Their examination of these cycles and their evident presumption that they are some permanent and more or less unchanging feature of the economic phenomena, together with their elimination of trends and seasonal movement, suggests that they are viewing their series as what we have called stationary series. They do not then presume that the cycles they seek to measure are strictly periodic, that is that they repeat themselves *exactly* every so often, for this would be naive. Their picture is rather of a super-position of a number of rather irregular cyclic movements of varying average frequencies (the frequency being the number of times a cycle repeats itself in a fixed unit time). It appears to the present writer that their underlying picture is very similar to that which will now be described.

We can break any strictly periodic cycle (in practice) down into oscillations of a simple type. Two oscillations of this type are shown in Fig. 1, one having frequency exactly twice the other.

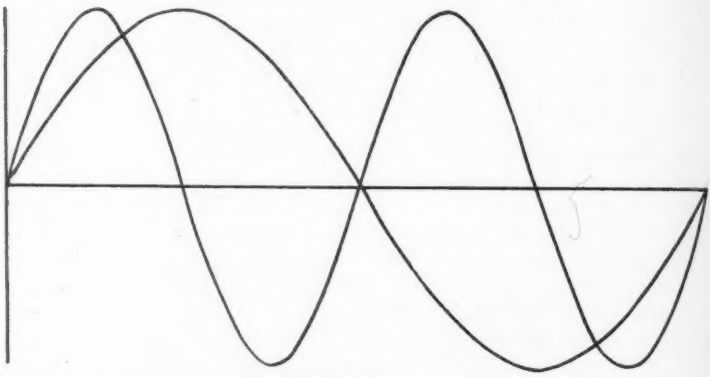

FIGURE 1

As we have said both experience and theory would reject the possibility of explaining a *finite* (and not infinitesimal) amount of the total variation of economic series by the addition of a *finite* number of curves of this simple type; economic reality is not that simple.[7] Nevertheless, provided that the process is stationary the series can be analysed in terms of these oscillations in the following way. With every stationary process (in practice) we can associate a "spectral density curve" of the kind shown in Fig. 2. If we arrange that the total area under the curve in Fig. 2 is unity then the area in the strip above δ_1 may be interpreted as that part of the total variation of the process, to which this curve belongs, which is explained by oscillations

7. The seasonal fluctuations would be regarded as part of the trend and removed with it.

having frequencies in the range δ_1. Thus the curve can be thought of as allotting the total "energy" of the process (its capacity to oscillate) to oscillations of various frequencies. As δ_1 becomes smaller the area in the strip above it shrinks to zero so that no one frequency explains any finite amount of the total variation. If we can from the data to hand (the n observations (1)) estimate this spectral density curve we shall have, clearly, a most relevant piece of information concerning the structure of the process generating our series. If the curve shows a fairly sharp peak, for example (as Fig. 2 does near δ_1) we shall be able to say that there is a *tendency* for the series to oscillate with a

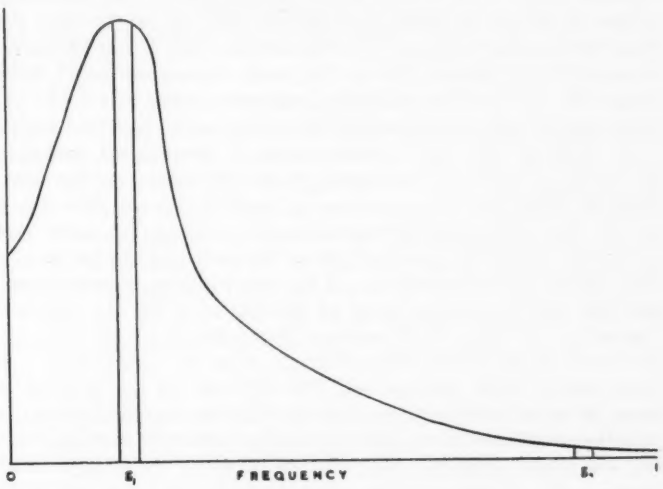

FIGURE 2

frequency near that corresponding to that peak. This seems to correspond to the "recurrent but not periodic" movement of which Burns and Mitchell speak. The sharper the peak the more marked this tendency will be. On the other hand high frequency oscillations (say in the range δ_2) are clearly unimportant in the case of Fig. 2. If the peak is at the origin (o in Fig. 2) then very low frequency oscillations will predominate and the series will show that smoothness with the absence of rapid "day to day" changes which is characteristic of many economic series. (A straight line can be regarded as a curve with zero frequency of oscillation.)

If the series were random, so that each observation was completely independent of every other observation in the series, then the spectral density curve would be a straight line a unit distance above and parallel to the horizontal axis in Fig. 2. The presence of a single oscillation explaining a finite amount of the total variation can be interpreted as the spectral density curve possessing an infinitely tall "spike" at that

frequency. (The estimate of such a curve will of course merely possess a high thin hump at that point.) Both of these alternatives will be rare in economics.

In fact it is possible to estimate this curve and over recent years great advances have been made with regard to the problem.[8]

As an example we may consider the series for bituminous coal production in the U.S.A. (1905 to 1939) shown, seasonally corrected, on page 59 of reference 6 and graphed on page 60 of that reference. Burns and Mitchell find that the typical cycle in this series, as detected by their methods, has a period of about 3 years 9 months (see pages 155 and 165 of their work). This is obtained by averaging a number of cycles, including the great depression whose extent, by their measurement, was nearly 8 years. It seems certain that, if our methods are to be applied, the trough due to the great depression would have to be regarded as part of the evolutive component, since it is doubtful if any stationary process which would generate a series like that experienced from 1905 to 1929 could produce such a pronounced trough as that from 1929 to 1937. It is interesting however to examine the series from 1905 to 1929. The series rises, at a decreasing rate, over this period and oscillations appear to increase in amplitude as the series rises. The trend was therefore removed from the series by fitting a quadratic polynomial to the logarithms of the observations, a procedure which will also tend to remove some of the tendency for the oscillations to depend on the height of the series. (Quarterly observations were used.) The series is therefore being thought of as the *product* of a smooth trend and a stationary process. The estimate of the spectral density curve of the stationary process shows only one significant peak, corresponding to an oscillation with a period of about 27 months. The curve (in a slightly idealized form for the sake of simplicity) is in fact shown in Fig. 2. The exclusion of the depression period, which accounts for much of the difference between the results of the two analyses, is a very subjective procedure and the analysis should not therefore be taken too seriously.

Once we have prescribed the spectral density curve we have (to a considerable extent) prescribed the process generating the observations. (Here we must enter the same caveats as we did with respect to the statement that the relations between observations j periods apart summed up the process.) But this knowledge does not translate immediately into action. For example, we do not see immediately what is the best way to predict x_{n+1} from $x_1, x_2, \ldots, x_n$. Moreover, we merely have an estimate of the spectral density curve so that if we wished to prescribe the curve in a precise mathematical way all we could reasonably seek to do would be to choose another curve, whose mathematical form we knew, which lay very close to the estimated curve. But this leaves a great range of possibilities as one could find curves of very

8. For a discussion and bibliography see M. S. Bartlett, *Stochastic Processes* (Cambridge, 1955), Section 9.2. It should be mentioned that applications of these techniques to economic data are at the present time almost unknown.

different mathematical form which all lay close to, say, the curve of Fig. 2. Nevertheless, *if we are prepared to use our judgment once more* the shape of the estimated curve will tell us a good deal about the mathematical form we should seek. In the next section we shall restrict our attention to a particular range of processes of a simple type which experience suggests will adequately explain a fairly wide range of economic series. If we were prepared to admit this experience into our analysis, *a priori* (of course a risk is involved) we could limit ourselves to this range from the beginning and thus simplify the analysis and strengthen our conclusions.

4. *Autoregressive Processes*

By an autoregressive series we mean a series generated by a process of the type[9]

$$x_t + a_1 x_{t-1} + \ldots + a_h x_{t-h} = \epsilon_t. \tag{3}$$

Here ϵ_t is the value at time t of an unobservable series whose elements are mutually independent. Thus values of x_t up to x_{n-1} (which is all the information we have about the corresponding values of ϵ_t) will not help us to predict ϵ_n. The best we can hope to do is to find the values of the a_j as accurately as possible.

What justification is there for choosing an autogressive process? A wide range of stationary processes can be written in the form (3) if the maximum lag is allowed to be arbitrarily large. One can find exceptions to this, a simple one being

$$x_t = \epsilon_t + \epsilon_{t-1} \tag{4}$$

but these exceptions appear to be rare in practice. However in the relation (3) the maximum lag h must be reasonably small in order that it should be of much practical use. The use of a relation of the form (3) rests, we think, on the following considerations:

(1) Dynamical considerations in economics would suggest a relation of form (3), at least before any other *simple* model. Consider for example the stock exchange index previously discussed. One could expect that buyers and sellers today in determining their offers would be affected by the previous day's price but also by its change from the day before that. If these two influences had an additive effect (but were given different weights in the mind of the investor) one would expect a relation of the following form (x_t being the price today of a particular share).

$$x_t = ax_{t-1} + b\,(x_{t-1} - x_{t-2}).$$

In addition however there might be some new information which had just arrived today (which can be taken to be completely independent of information on previous days since otherwise the effects would already be taken care of in x_{t-1} and x_{t-2}) which disturbs the offer of the investor from that given by the relation just written.

9. The a_j have to satisfy certain conditions in order that the process should be stationary.

This leads to a relation of the form

$$x_t = (a+b)\, x_{t-1} - b x_{t-2} + \epsilon_t.$$

where ϵ_t measures the influence of the new information.

This is of the form (3) and one might therefore hope that the average of many prices determined in this kind of way would be generated by a relation of this form also. Of course this is over-simple. For example the investor probably has in his mind the news of yesterday (ϵ_{t-1}) as well as today and allows it to influence him directly as well as through x_{t-1} so that the relation may be more like

$$x_t = (a+b)\, x_{t-1} - b\, x_{t-2} + (\epsilon_t + c\, \epsilon_{t-1})$$

which is not the same as (3) since x_{t-1} is not independent of $(\epsilon_t + c\, \epsilon_{t-1})$. If c were small however a relation of the form (3) might still be a good approximation if sufficiently high lags were allowed on the right-hand side.

(2) Economic series are usually too short to allow a very searching analysis of the data to be made. It is a matter of common experience that one can usually find an autoregression with h quite small which fits the observations too closely for it to be rejected by any reasonable test. One does not of course believe that one has found the true nature of the process generating the observations.

(3) Alternative models, sufficiently simple for application to short series, are usually unacceptable. Of these the one which has received the greatest attention is the moving average. This is a series generated by a relation of the form

$$x_t = \epsilon_t + b_1 \epsilon_{t-1} + \ldots + b_k \epsilon_{t-k} \tag{5}$$

In a sense the moving average is more general than the autoregression since any autoregression can be written as a moving average (if k is allowed to increase indefinitely) but the reverse is not true (e.g. (4) above). However, it is a moving average of finite extent with which we must be concerned and again experience suggests that rarely will a moving average with k small give better results than an autoregression of roughly the same order.[10] It is more difficult to think of an economic process leading to a relation of the form (5).

(4) The estimation procedures for the autoregression are simple and it leads to simpler final analyses, in those cases where its determination is a preliminary step. These considerations are of course subsidiary to the first three.

If one is prepared to say, from considerations such as these, or after examining an estimated spectral density curve, that the process is autoregressive the problem of finally naming the process generating the series being examined can be completely solved. This solution involves the determination of the maximum lag (the value of h in (3)) and the estimation of the constants a_j.

A reasonable method of determining h will be to start from the simplest possible hypothesis, $h = 0$, and to proceed by testing this

10. See for example A. Rudra, *Biometrika*, Vol. 89, 1952, p. 436 table 1.8.

against the hypothesis $h = 1$, if it is rejected testing $h = 1$ against $h = 2$, if this is rejected testing $h = 2$ against $h = 3$, and so on until an hypothesis is not rejected. Such a procedure cannot be followed uncritically but in many cases will lead to satisfactory results. The sequence of these tests will be based on the statistics r_j defined by (2) and it is in relation to the probability laws of these statistics that a second great advance has taken place over the last 10 years[11] (though the first work was done in the early 1940's and the basis of the ideas was laid down by Yule as early as 1927).

Once the maximum lag is determined the coefficients can be estimated in a relatively straight forward manner.[12]

When a particular process is chosen by a procedure such as that which has been described it is often desirable to subject it to a test of a general nature (i.e. a test considering a wide range of alternatives, not one which puts the next highest order autoregression prior to other alternatives). A number of tests of this type have now been developed.[13]

5. *Multivariate Processes*

One is perhaps unlikely to be considering a single series of observations. If one is considering a larger number of series simultaneously however one cannot neglect the interrelations between the several series and the analysis therefore does not break down merely into a number of repetitions of that described in the last two sections.

The analysis of such systems of series can nevertheless be approached along the lines of sections II to IV. Again the analysis will be based upon a preliminary treatment which makes the system stationary (approximately). Stationariness now requires, of course, that the relationships between pairs of series should not be changing through time. Each aspect of the analysis of previous sections has its analogue, though the difficulties introduced by the fact that one now has a set of observations at each point of time and not a single observation usually result in a less "exact" statistical method being the best that is available.[14] In addition, however, new possibilities arise which have no analogue in the case of a single series. For example one could seek for some common factors which, though relatively small in number, explained a significant part of the joint variation of a larger number of series.[15] Such techniques, in relation to the type of series met in economics, could however at present be based on only the shakiest of foundations. Indeed analyses of systems of economic series by the techniques considered in this section appear to be non-existent,

11. See papers by Watson, Daniels and Jenkins in *Biometrika*, Vol. 43, June, 1956.
12. See for example G. Tintner, *Econometrics*, New York (1952), p. 294.
13. M. H. Quenouille, *Journal of the Royal Statistical Society*, Vol. 110, 1947, p. 123; P. Whittle, *Biometrika*, Vol. 39, 1952, p. 309. See also ref. 7 sections 9.11 and 9.21.
14. M. S. Bartlett, *Stochastic Processes* (Cambridge, 1955), Section 9.3.
15. See for example, M. H. Quenouille, *Associated Measurements* (London, 1952), p. 309.

which is not surprising since the subject is not in a very advanced state and what is known has become known only very recently.

6. *A Single Regression*

Either because of a preliminary analysis or because of confidence concerning our knowledge of the working of the system we are often led *a priori* to relate the series to be explained to other series. In this section we shall consider situations where the causation can be reasonably regarded as running one way only (towards the series to be explained).[16] The "cleanest" example of this type of situation is that where the "causing" variable is time (and a trend is being determined). Again an organization might be trying to determine unit cost by relating total cost to the observed quantities of types of products. If the sales of the organization were a small part of the total market, the causation could be regarded as going one way only. The situation does not exclude the possibility that the causing variables include lagged values of the variable to be explained. Thus equation (3) is of the present type.

We shall be concerned therefore with a relation of the general form

$$(6) \qquad z_t = b_0 + b_1 y_{1,t} + b_2 y_{2,t} + \ldots + b_k y_{k,t} + x_t$$

where z_t is the series to be explained, $y_{j,t}$ is the j^{th} explainer (in particular it might be z_{t-p}) and x_t is an unobserved residual which we assume to be of the type considered in previous sections. The classical method of estimating the b_j is that of least squares which is described in any elementary text. Here we wish to discuss three problems in relation to which advances have been made in the last 10 years.

(1) The use of the computationally simple method of least squares relies for its full validity (amongst other things) on the assumption that the x_t in (6) are random (like ϵ_t in (3)). If the x_t in (6) are not random, the validity of the least squares estimation procedure is destroyed when amongst the $y_{j,t}$ occurs some lagged value of z_t. (Indeed the basic model is then inappropriate and needs reformulation). When no such lagged value occurs the validity of least squares is not destroyed, but the method may become very inefficient. The loss of efficiency depends upon the $y_{j,t}$ as well as x_t. In the special case where $y_{j,t} = t^j$ so that a polynomial trend is being eliminated the loss of efficiency *for any (reasonable) process generating* x_t will be small if the number of observations is reasonably large.[17] For general $y_{j,t}$, however, the loss may be large even when x_t is very near to random. The situations where this is so are perhaps unlikely to occur in economics so that a procedure which removes most of the lack of randomness from the residuals will often result in a fairly efficient analysis. (Inefficient methods may be regarded as methods which effectively throw away observations.)

16. We do not wish to enter here into a precise discussion of the conditions required for the application of single equation methods.

17. U. Grenander, *Annals of Mathematical Statistics*, Vol. 25, 1954, p. 252.

(2) In order to know whether there is any loss of efficiency it is necessary to test whether the residuals x_t in (6) are random. For the case where no $y_{j,t}$ in (6) is of the form z_{t-p} tests have been given.[18] The case where lagged values of z_t occur among the $y_{j,t}$ has not been treated precisely.

(3) The third aspect of the problem is that of determining whether the $y_{j,t}$, either individually or collectively, add anything significant to the explanation of z_t. If x_t were random, this problem would be solved by the use of classical methods of partial and multiple correlation. It has been known for many years that when x_t is not random these methods can lead to invalid conclusions and moreover that they make inefficient use of the basic data. The problem is not one to which a precise answer has been given (particularly in the case where k in (6) is greater than unity) nor is a subjective element (in the choice of the range of alternatives to the hypothesis of no relation between z_t and some or all of the $y_{j,t}$) entirely removable. However, reasonably efficient and valid methods are available.[19]

It should be mentioned that in the case where a polynomial trend is being removed, the classical methods of partial and multiple correlation are nearly fully efficient (in testing for the reality of the trend). This corresponds to the already mentioned result that least squares is (for reasonably large numbers of observations) near to fully efficient. However, the tests need to be modified in order to make them valid. This cannot be done precisely but approximate procedures are available.[20]

The approximate procedure just mentioned involves, fundamentally, the estimation of the height of the spectral density curve (Fig. 2) for x_t, at the origin. This brings us back to the considerations of section III, for after having eliminated the effects of the $y_{j,t}$ one will, for a complete understanding of the nature of z_t, want to analyse x_t. The x_t are not observable, however, so that the analysis will be based merely on estimators of them. This problem, again, has not so far been given a precise solution even in the simplest cases. Provided the number of observations, n, is large the methods of sections 3 and 4 could be satisfactorily applied to the estimated residuals but for small n this would almost certainly result in considerable biases.

7. *Systems of Regressions*

Finally, we come to the situation involving both the greatest realism and the greatest amount of prior theory (and therefore the greatest danger) where the economist is led not to a single relation of the form (6) but to a whole system of such relations, connecting a num-

18. J. Durbin and G. S. Watson, *Biometrika*, Vol. 38, 1951, p. 189. E. J. Hannan, *Biometrika*, Vol. 44, 1957, Part II.

19. M. H. Quenouille, *Journal of the Royal Statistical Society*, Series B, Vol. II, 1949, p. 68.

20. See for example, G. S. Watson, *Biometrika*, Vol. 42, 1955, p. 328; G. S. Watson and E. J. Hannan, *Biometrika*, Vol. 43, 1956, p. 436, and references given therein.

ber of economic variables. It is well known that in such systems the use of least squares applied to each equation individually can lead to an inappropriate analysis.[21] It will not necessarily do so, however. It has been argued by some writers[22] that the nature of economics is such that the model can always be set up so that in each individual equation causation runs only one way, so that least squares may be applied to each equation individually. If we use $y_{1,t}, y_{2,t}, \ldots, y_{p,t}$, to indicate the variables whose values are jointly determined by the model, and $x_{1,t}, x_{2,t}, \ldots, x_{q,t}$, to indicate variables whose values are determined entirely independently of the $y_{j,t}$, then the relations determining these latter, it is claimed, can always be set up in the following general form

$$
\begin{aligned}
y_{1,t} &= (\text{Linear combination of the } x_{j,t} \text{ and lagged values of some or all of the } y_{j,t}) + \epsilon_{1,t}. \\
y_{2,t} &= (\text{Linear combination of } y_{1,t}, \text{ the } x_{j,t} \text{ and lagged values of some or all of the } y_{j,t}) + \epsilon_{2,t}. \\
y_{3,t} &= (\text{Linear combination of } y_{1,t}, y_{2,t} \text{ the } x_{j,t} \text{ and lagged values of some or all of the } y_{j,t}) + \epsilon_{3,t}. \qquad (7) \\
&\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \\
y_{p,t} &= (\text{Linear combination of } y_{1,t}, y_{2,t}, \ldots, y_{p-1,t}, \text{ the } x_{j,t} \text{ and lagged values of some or all of the } y_{j,t}) + \epsilon_{p,t}.
\end{aligned}
$$

Here the $\epsilon_{j,t}$ are unobservable residuals. Such systems are said to be recursive.

Since the $x_{j,t}$ are not affected by the $y_{j,t}$ and certainly the value assumed by $y_{j,t-1}$ cannot be determined to any degree by the value taken on by any $y_{k,t}$ we see that, neglecting the $\epsilon_{j,t}$ for the moment, the chain of causation runs only one way in the first relation in (7). But then it runs only one way in the second also, since $y_{1,t}$ is not affected by $y_{2,t}$. The same is true of the third, and so on.

We cannot, however, neglect the $\epsilon_{j,t}$. If $\epsilon_{1,t}$ was related to $\epsilon_{2,t}$ then $y_{1,t}$ would be dependent on $\epsilon_{2,t}$ also, but then also on $y_{2,t}$, so that the argument of the previous paragraph would be invalid. Thus we must (in general) add the requirement that all of the $\epsilon_{j,t}$ are independent. Moreover, if $\epsilon_{2,t-1}$ and $\epsilon_{2,t}$ were related (i.e. $\epsilon_{2,t}$ is serially correlated) and $y_{2,t-1}$ was present on the right-hand side of the first relation then $y_{1,t}$ would depend on $y_{2,t-1}$, thus on $\epsilon_{2,t-1}$, thus on $\epsilon_{2,t}$ and thus finally on $y_{2,t}$ and again the argument of the previous paragraph would be invalid. Thus we must further require, in general, that the $\epsilon_{j,t}$ be serially independent.

It might be arguable that, if one took observations sufficiently close together in time and amplified the model sufficiently, eventually a situation would be reached where all of these conditions were fulfilled. However, in practice it appears that this happy situation will not be met. For example $\epsilon_{1,t}$ might initially be independent of all the other $\epsilon_{j,t}$ and of lagged values of itself, but might be related to $\epsilon_{2,t-1}$. If now our observations cover twice as long a period of time, so that

21. See reference 1.
22. See R. Bentzel and B. Hansen, *The Review of Economic Studies*, Vol. 22, 1954-5, p. 153, for a discussion and references.

the residuals in the first two of the new resulting equations (7) will be $(\epsilon_{1,t} + \epsilon_{1,t-1})$ and $(\epsilon_{2,t} + \epsilon_{2,t-1})$, then these residuals will no longer be independent. Again we may be forced to reduce the size of the model by aggregation and this process may include the aggregation of $y_{1,t}$ and $y_{3,t}$. The new variable will now have a relation with $y_{2,t}$ which runs both ways.

In practice therefore we may be led to systems of relations of a general interdependent form, for example, when $p = 2$ and $q = 1$,[23]

$$(8) \qquad \begin{aligned} y_{1,t} &= a_0 + a_1 y_{2,t} + a_2 y_{1,t-1} + \epsilon_{1,t} \\ y_{2,t} &= b_0 + b_1 y_{1,t} + b_2 y_{2,t-1} + b_3 x_t + \epsilon_{2,t} \end{aligned}$$

This is not of the form shown in (7) as $y_{2,t}$ occurs in the first relation. We may now drop the requirement that $\epsilon_{1,t}$ and $\epsilon_{2,t}$ are independent as no additional difficulty arises and, as we have seen, the requirement is very restrictive. Now a number of different possibilities present themselves.

(1) One may use least squares on each of the two equations in (8). As is well known (see reference 1) this leads to estimates of the a_j and b_j in (8) which are invalid in the sense that these estimates are really estimates of quantities differing from the a_j and b_j. When the number of observations (on each variable) is large the error on this account can *not* be ignored as it dominates the situation, but when the number of observations is small this is by no means so certain. The situation as compared with alternative methods to be discussed below is like two marksmen one of whom (the least squares one) has his sights adjusted so that he fires always, by a fixed amount, to the right of the target. However, he is always more accurate than his competitor. If the error due to his sights is small (he is just off the bull's-eye) he may still get a better score than his competitor. However, if the accuracy of both continues to improve this will (eventually) not be so.

(2) It is mathematically fairly easy to give a method which is (more or less) optimal when n is large.[24] This solution is computationally very burdensome when the number of equations is large.

(3) An alternative method[25] has been used in practice (which neglects some information and is therefore not optimal). The method treats each equation separately and the information neglected, in the case of the first equation in (8), would be that contained in the prior knowledge that $y_{1,t-1}$ does *not* occur in the second equation.

(4) The method discussed under (3) can still be computationally very burdensome, but if enough information is neglected this burden can be removed to the point where the procedures are equivalent to ordinary least squares methods. For example, if in estimating the first

23. The reader who prefers concrete examples could refer to Part II of Reference 1 for a general discussion of such models.

24. T. C. Koopmans, *Statistical Inference in Dynamic Economic Models* (New York, 1950).

25. T. W. Anderson and H. Rubin, *Annals of Mathematical Statistics*, 1949, Vol. 20, p. 46.

equation in (8) we neglect the fact that x_t occurs in the second equation, but not in the first, we reach this situation. This further loss of information again reduces the efficiency of the techniques of course.

(5) A fourth method has been provided by Thiel.[26] His method is an approximation to that discussed under (3) but has the advantage of requiring fewer computations.

The choice among this large number of possibilities depends very largely upon the individual situation. With a fairly large number of observations, in a problem of importance with considerable computing facilities, (2) would be adopted. In many cases in practice, on the other hand, the loss of information involved in (4) might not matter.

Of the three assumptions mentioned earlier in this section that which required the $\epsilon_{j,t}$ to be serially independent has not been dropped. This assumption raises all of the difficulties of section 6 again but in a more difficult form. If $\epsilon_{1,t}$ and $\epsilon_{2,t}$ in (8) were serially correlated, then the methods just discussed would become invalid. If the relations did not involve $y_{1,t-1}$ and $y_{2,t-1}$, the methods would still be valid but would be inefficient. Some kind of answer, in the general situation corresponding to this last example, can be given to the problem of testing the residuals for serial correlation[27] but in the more general case (where $y_{1,t-1}$ and $y_{2,t-1}$ do occur in the model) only very inexact methods are available. A great deal of very difficult work remains to be done in this field.

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26. H. Thiel, *Revue de L'Institut International de Statistique*, Vol. 23, No. 1/3, p. 36.

27. E. J. Hannan, *Proceedings of the Cambridge Philosophical Society*, Vol. 52, 1956, pp. 482-487.

THE 1946-7 TRANSACTIONS TABLE

The first section of this paper sets out a method for compiling future Australian transactions tables. This method is based on the lessons learnt in exploring alternative techniques of compiling the 1946-7 table. Later sections of the paper discuss some special aspects of the table for 1946-7.[1]

1. *Compilation*

If the reader turns to the recently published 1953-4 *Secondary Industries* production bulletin, he will find in Table 56 a somewhat aggregated tabulation of the cost structure of each manufacturing industry.[2] On a bird's-eye view, the process of compiling an Australian transactions table for 1953-4 would involve: firstly, adjusting the aggregates of Table 56 to give a complete coverage; secondly, disaggregating the grouped costs into their constituent items—a process in which other tables in the bulletin assist materially; thirdly, compiling similar cost structures for rural, mining and service industries.[3]

However an efficient compilation procedure, such as we will now describe, is dominated by the need to ensure that the table is consistent in an accounting sense. The published figures for total costs or value of output of each industry in Table 56 are, of all published statistics, assumed to be the figures with the most comprehensive coverage of productive activity. The only qualifications to this assumption are: firstly, that there are ten industries for which recorded coverage appears low;[4] secondly that we wish to include *all* materials used in total costs (whereas official statistics do not include those materials in respect to work done on commission or assembly work); thirdly, our treatment of internal sales differs somewhat from the official figures, and this is discussed below in section 3.

1. Most of the statistical compilation of the 1946-7 table was done during 1953-6 by a team of from one to four graduate assistants including for varying periods: Frances Long, C. P. Harris, N. J. Bacon, D. P. Evans, C. G. Banks, Betty Watson and Laura Hodan. The project was financed from several sources, including the Social Science Research Council and the University College, Canberra. I should like to express my thanks to these, as well as to the Commonwealth Statistician's staff and to the group of private firms and government agencies who gave generous assistance to the research team.

Before reading the fold-in table, the reader should refer to the explanatory Notes at the end of this paper.

2. This table headed "Factories: Total value, and value per person engaged, of output and of the various items of outlay, in each industry, Australia" has of course a long history reaching back to the earliest production bulletins.

3. Again in this third stage the major sources of information are the publications of the Commonwealth Bureau of Census and Statistics. Other important official sources are the *Report* of the Taxation Commissioner, the publications of the N.S.W. Statistical Bureau, the *Reports* of the Railway Commissioners and *The Australian Mineral Industry*.

4. *Viz.*: motor vehicle repairs, tailoring, millinery, dye works, dressmaking, watches and clocks, boot repairs, bakeries, ice-cream and aerated waters. The coverage of these industries was adjusted as a result of comparison with censal and other data.

At this point we may suggest that it is convenient to compile the table at producer's value (i.e. value at farm or factory) because the *Secondary Industries* bulletin is compiled on this basis. However, because most information on sales is only available at purchaser's values, the original worksheets have to be compiled, in part at least, on this latter basis. Finally, wherever possible, quantities should also be collected—and in the 1946-7 table these are reproduced in preference to producer's values as being useful statistics in a proposed analysis of the form of production functions.

Classifications of commodities as well as of industries must be decided upon at an early stage and all available statistics regrouped on the chosen classification. Once this has been done we can use the *Production* and *Overseas Trade* bulletins to draw up a list of the aggregate supply—home production *plus* imports—of each commodity. In fact this is a tentative step because recorded statistics for home production may be incomplete—so our objective is to clarify this position as rapidly as possible. The recorded home production of each commodity is therefore "assigned" to the one or more industries producing that commodity. The total of such commodity assignments to any one industry is the total recorded value of commodities produced by the industry. This total can be checked against the total cost of the industry from Table 56 (as adjusted). If the two figures are not equal an adjustment is necessary—which usually means that recorded production of commodities must be written up.[5]

The method of handling the rural, mining and service sectors is the same in principle as in the case of manufactures, but the sources of information are less adequate. D. V. Youngman has made a major contribution to the analysis of rural costs in his 1952 A.N.Z.A.A.S. paper.[6] Since 1952 our knowledge of the costs of the mining industries has been increased by the *Mining and Quarrying* bulletin. In the service or tertiary sector, some published information is available on the rail, air and shipping industries. However, data on the costs of the other service industries is sketchy and the filling in of gaps is necessarily tentative. It is none the less characteristic of the compilation procedure that the final statistics gain in reliability from the need to ensure that the total costs of an industry equal the total value of the commodities it produces.

Now that the row and column totals are established as consistent, we may proceed to compile the main section of the transactions table either by searching for information on costs and inputs (e.g. from Table 80 in the 1954 *Secondary Industries* bulletin) or by seeking information from producers on the distribution of their commodity sales

5. The original compilation for 1946-7 was made on a 266 commodity classification. For that year it appeared that recorded production did not equal actual production for 73 of these commodities: in 9 cases recorded production was over 90 per cent of actual, in 27 cases recorded production was reckoned to be less than 25 per cent of actual, and the remaining 37 cases fell between.

6. D. V. Youngman, "The Estimation of Farm Income", Section G, A.N.Z.A.A.S.

Sales To:		1. Farms	2. Forestry	3. Milling cereals	4. Bakery	5. Biscuit making	6. Butter factory	7. Cheese factory	8. Process Milk	9. Ice-cream	10. Margarine	11. Meat canning	12. Bacon curing	13. Sugar mills	14. Refined sugar	15. Confectionery	16. Aerated waters
1 Wheat	m.bus	76.562	.....	73.780	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2 Barley	m.bus	7.6121	.....	.38969	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3 O'r grains	m.bus	13.516	.....	6.7977	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4 Flour	m.sh.ton	.....	.....	1.5316	.57907	.03378	.....	.....	.....	.....	.....	.....	.....	.....	.....	.00192	.....
5 Cereal foods	m.cwt	.....	.....	2.6079	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.0047	.....
6 Bread	m.2lb.lf	.....	.....	.....	690.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7 Biscuits	'000 ton	.....	.....	.....	.....	39.600	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8 O'r bakery	£m	.....	.....	.....	11.5378	.4754	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9 Bran,pollard	m.sh.ton	.60044	.....	.6082	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10 Mutton	m.ton	.30259	.....	.....	.....	.....	.....	.....	.....	.....	.....	.01056	.....	.....	.....	.....	.....
11 Beef	m.ton	.48776	.....	.....	.....	.....	.....	.....	.....	.....	.....	.06532	.....	.....	.....	.....	.....
12 Pigmeat	m.ton	.6485	.....	.....	.....	.....	.....	.....	.....	.....	.....	.00758	.05989	.....	.....	.....	.....
13 Bacon,ham	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.00206	.04771	.....	.....	.....	.....
14 Tinned meat	'000 ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23.708	.....	.....	.....	.....	.....
15 Milk	m.gal	1.056.1	.....	.....	.405	.062	645.352	88.175	91.267	7.855	.....	.....	.....	.....	.....	.425	.....
16 Butter	'000 ton	.....	.....	.....	1.3465	.8764	138.811	.....	.....	.72493	.....	.....	.....	.....	.....	.31115	.....
17 Cheese	'000 ton	.....	.....	.....	.....	.....	.....	41.904	.....	.....	.....	.....	.....	.....	.....	.....	.....
18 Proc.milk	'000 ton	3.4195	.....	.....	.52625	.3409	.....	.....	80.00	4.1868	.....	.....	.....	.....	.....	3.9063	.....
19 Icecream	'000 gal	.....	.....	.....	.....	.....	.....	.....	.....	11.617	.....	.....	.....	.....	.....	.....	.....
20 Margarine	'000 ton	.....	.....	.....	9.15	3.228	.....	.....	.....	.....	22.981	.....	.....	.....	.....	.....	.....
21 Fruit, nuts	m.bus	49.258	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.03287	.4804
22 Sugar cane	m.ton	4.027	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.0269	.....	.....	.....
23 Raw sugar	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.55185	.43760	.....	.....
24 Refined sugar	m.ton	.....	.....	.00116	.02055	.00794	.....	.00002	.01776	.00331	.....	.....	.00019	.....	.4219	.04639	.02839
25 Sugar by products	m.ton	.06145	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.182241	.00913	.01456	.....
26 Confectionery	m.lb	.....	.....	.....	.....	.....	.....	.....	.....	.00101	.....	.....	.....	.....	.....	136.151	.....
27 Aerated waters	m.gal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	43.4019
28 Beer	m.gal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29 Wine	m.gal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
30 Spirits	m.prf.gal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31 Leaf	m.lb	3.994	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
32 Tobacco	m.lb	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
33 Tea	m.lb	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
34 O'r foods	£m	3.6857	.....	.....	1.7309	.11075	.01414	.....	.....	.0723	.....	.03495	.....	.....	.....	.39484	.04393
35 O'r rural	£m	53.950	5.8658	.17752	.68934	.07220	.....	.....	.....	.....	.....	.47107	.....	.....	.....	.85787	.....
36 By products	£m	.....	.....	.3458	.....	.....	2.5936	.....	.18097	.....	.....	2.7519	.89573	.....	.....	.....	.....
37 Logs	m.sup.ft	.....	1881.76	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
38 Bark	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
39 Sawn timber	m.sup.ft	35.607	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
40 Joinery	£m	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
41 Boxes	£m	1.3028	.....	.....	.....	.....	.34655	.08585	.15549	.23688	.....	.0362	.06467	.....	.28899	.....	.31693
42 Furniture	£m	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
43 Paper	m.ton	.00268	.....	.....	.....	.....	.00279	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
44 Newsprint	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
45 Paperboard	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
46 Publications	£m	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
47 Cartons	£m	.....	.....	.33196	.12131	.12048	.....	.....	.....	.....	.05827	.02422	.12788	.....	.19297	.57114	.....
48 Crude rubber	m.cwt	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
49 Tyres	'000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
50 Retreads	'000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
51 O'r rubber goods	£m	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
52 Sheepskins	m.	18.583	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
53 Sheeppelts	m.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
54 Rabbitskins	m.lb	14.764	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
55 Other hides	m.	.....	4.7141	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
56 Heavy leather	m.lb	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
57 Light leather	m.sq.ft	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
58 Leather goods	£m	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
59 Footwear	(index)m.pr	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
60 O'r manufactures	£m	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
61 Greasy wool	m.lb	844.57	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
62 Scoured wool	m.lb	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
63 Wool fabric	m.sq.yd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
64 Knitted goods	£m	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
65 Raw cotton	m.lb	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
66 Cotton fabric	m.sq.yd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
67 Synthetic fabric	m.sq.yd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
68 Flax fibre	'000 ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
69 O'r yarns	m.lb	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
70 Clothes	£m	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
71 O'r textiles	£m	3.1538	.....	1.5212	.....	.....	.....	.....	.....	.....	.....	.....	.07961	.00721	.01426	.....	.....
72 Wool wastes	m.lb	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
73 By products	£m	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
74 Aluminium	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
75 Copper	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
76 Lead	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
77 Silver	m.f.oz	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
78 Zinc	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
79 Tin	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
80 O'r minerals	£m	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
81 Non-ferrous goods	£m	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
82 Iron ore	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
83 Black coal	m.ton	.....	.....	.03361	.00241	.00624	.04225	.00156	.02640	.00184	.0073	.10364	.01581	.02873	.09028	.01644	.00501
84 Brown coal	m.ton	.....	.....	.00354	.00011	.....	.01074	.....	.....	.....	.....	.00101	.....	.....	.00061	.00285	.00033
85 Coke	m.ton	.....	.....	.00457	.02241	.00348	.00181	.....	.00039	.00022	.00074	.00157	.00087	.00096	.01782	.00321	.00114
86 Briquettes	m.ton	.....	.....	.00015	.01087	.00087	.04314	.....	.....	.00003	.0004	.00221	.00133	.....	.00146	.....	.....
87 O'r fuels	£m	.....	3.1198	.03043	.20377	.00527	.12988	.03017	.02516	.00329	.00133	.01282	.02365	.0406	.....	.02149	.01059
88 Electricity	m.kwh	.....	.....	90.855	33.82	4.299	42.631	2.705	11.941	13.294	3.736	20.755	14.157	2.9239	1.81808	20.983	9.315
89 Coal gas	m.cu.ft	.....	.....	64.818	145.073	211.552	1.640	.16318	.....	7.424	.526	2.744	6.154	7.646	.....	61.323	10.342
90 Crude petroleum	m.gal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
91 Petrol	m.gal	78.902	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
92 Fuel oil	m.gal	73.73	.....	1.1622	1.8355	.13839	1.1794	.06311	.42431	.13834	.02622	.18332	.10808	.26974	.15431	.36642	.08701
93 O'r min. oils	£m	.....	.....	.00933	.00539	.00046	.01432	.00131	.0033	.00112	.00023	.00451	.00151	.01227	.00409	.00139	.00247
94 Pig iron	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
95 Slag	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
96 Scrap	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
97 Ferrous castings	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
98 Steel ingots	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
99 Ferrous pipes	m.ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
100 Ferrous wire	m.ton	.....	.00202	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
101 Sheet metal prod.	£m	.52815	.....	.01429	.01245	.01236	.....	.11229	1.1068	.00051	.04733	1.8993	.....	.....	.09979	.05758	.093
102 Cutlery	£m	.17179	.00302	.....	.....	.....	.....	.....	.....	.....	.....	.01815	.....	.....	.....	.....	.....
103 Tractors	'000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
104 Agricult. mach.	£m	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
105 Misc. machinery	£m	4.9547	.....	.21645	.2299	.03888	.21860	.03642	.07045	.13254	.01482	.19734	.05111	.20474	.06452	.13319	.10135
106 Electrical goods	£m	.....	.....	.02436	.02568	.....	.02929	.....	.....	.....	.....	.02569	.....	.03056	.....	.....	.....

15. Confect nery	16. Aerated waters	17. Brew- eries	18. Winer- ies	19. Tobacco factory	20. Ck proc foods	21. Saw milling	22. Box making	23. Joinery	24. Furnit- ure	25. Paper- making	26. Print- ing	27. Carton- making	28. Rubber tyres	29. Retread ing	30. Tanning	31. Leather goods	32. Shoe factory
.....	.....	.17043	.08906	.....	.28115	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	4.69973	.26705	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	5.6613	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
00192	.....	.....	.....	.....	.10505	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
0047	.....	.....	.....	.....	.13027	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
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.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.1691	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....

16. rated ters	17. Brew- eries	18. Winer- ies	19. Tobacco factory	20. Or proc foods	21. Saw milling	22. Box making	23. Joinery	24. Furnit- ure	25. Paper- making	26. Print- ing	27. Carton- making	28. Rubber tyres	29. Retread ing	30. Tanning	31. Leather goods	32. Shoe factory	33. Or fac- tories	34. Cotton mills	35. Wool scour	36. Woollen mills	37. Hosiery	38. Synthet tertile	39. Cloth- ing	40. Special textile	41. Copper	42. Lead- zinc	43. Tin	44. Other mining	45. Nonferr rolling	46. Iron mining	47. Black coal
.....	.17043	.08906	.....	.28115	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	4.69973	.26705	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	5.6613	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.10505	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.13027	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.1691	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....

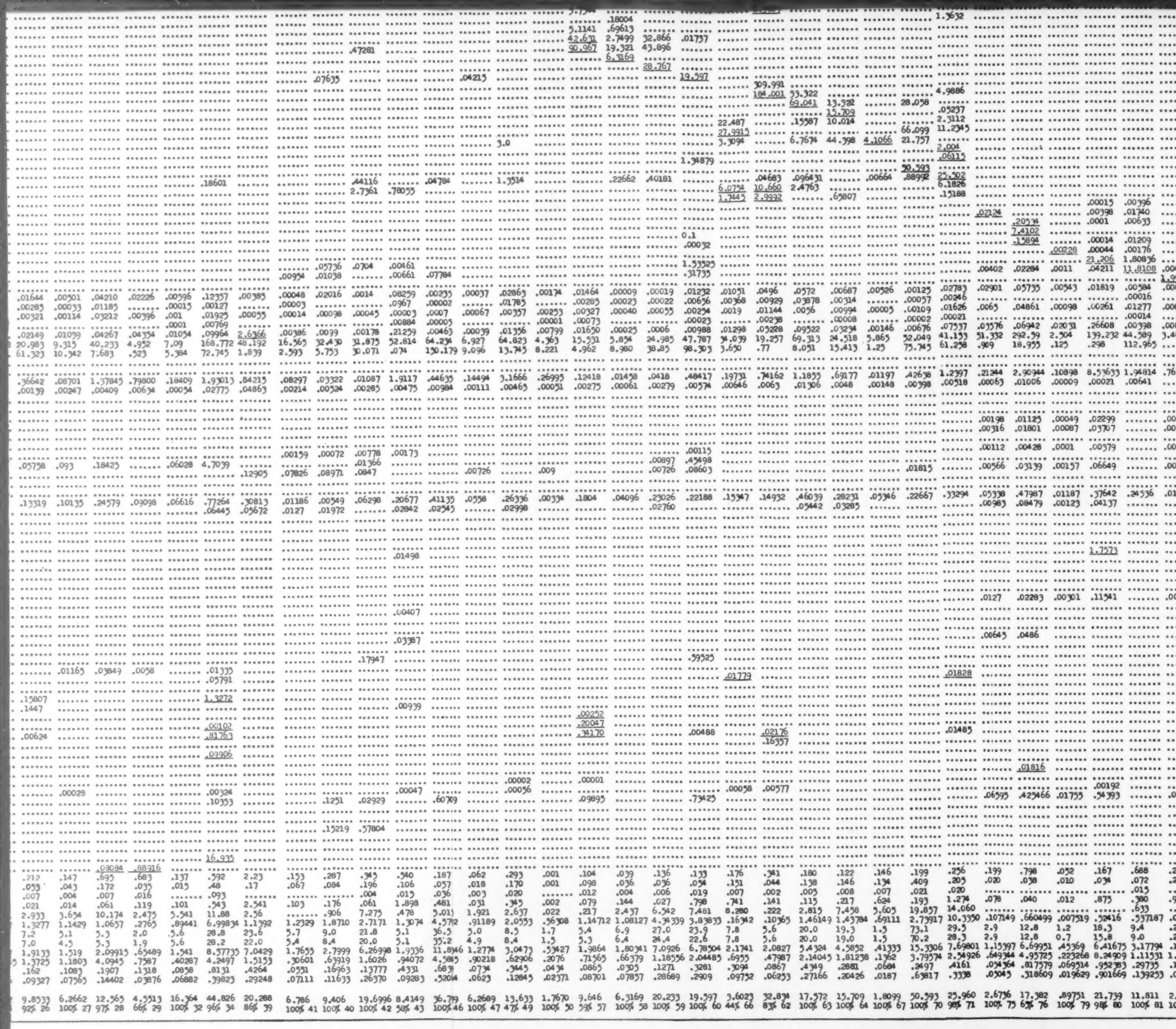
46. Iron mining	47. Black coal	48. Brown coal	49. Coke works	50. Briquetting	51. Mineral oils	52. Electricity	53. Gas works	54. Steel making	55. Engineering	56. Radio, electrl	57. Motor vehicle	58. Fibrous plaster	59. Cement	60. Asbestos cement	61. Cement goods	62. Carbide etc.	63. Br wo
												.15331					
1.062	19.093								20.7		11.615						
									.07361	.01954							
					.17769			.04635	.643	.17113	.05569						.0
										.00106		.00072					
										.11453			.26068				
									5.833		196.117						
.00945									2.28094	.51364	.43615						
									2.6946		10.783						
									.33195								
										.18964							
												.01698					
			.014444					.00016				.0052		.01495	.00376	.11054	
									.00021		.00004						
									.00068								
									.00054		.00302						
									.00301		.00042	.00045					
.00434	.12682				.19146				.55373	.38598	.57292	.06171	.02573	.299	.67083	.1055	.23166
1.9945									7.9963	2.30389	.36088					.00525	
.00027	13.756		1.83946		.01225	3.1178	1.85802	.22098	.162559	.00705	.00283	.00019	.34904	.00162	.00122	.0132	
		3.882		1.91206		3.70978		.00021	.00235	.00022	.00649			.00039		.00008	
.00002			1.1781		.00017	.05239	.36202	1.15718	.11879	.0016	.00256	.0003	.00093	.00041	.00024	.01113	
				.43034		.27464	.00002	.00002	.0006	.00004						.00393	
.00834	.00913		.89766		.00211	.26129	.54415	.11698	.08222	.00574	.01068	.00079	.0025	.00023	.00351	.02301	
3.463	85.581	5.882	7.872		2.141	6.172.4	10.782	98.063	381.308	62.589	87.241	1.032	72.038	6.492	5.817	20.237	
			85.647		1.444	247.88	33.250	1560.6	1006.8	153.13	93.097	1.916	.441	1.581	.563	10.060	
					75.578												
					24.939												
.76389	2.89914	.105	.00056		46.556	28.0122	6.08256	.93507	9.8715	.40842	1.324	.01471	.03118		.01879	.33384	
			.00129	.00189	.95848	.0778	.05553	.02935	.09295	.00842	.02053	.00058	.00691	.0019	.00355	.00355	
								.23782	.28298								
								.13717								.15717	
								.17971	.21889								
.00191									.06386	.01335	.01092						
.00324	.02106							1.3124	.91794	.02624	.04927						
									1388								
.00062	.00172								.12484	.00492	.01888				.01144	.00043	
	.03479				.24567				17.798	1.1741	.25862						
.00395	.06053							.01815	.74332	.09069	.18116						
									4.386								
									4.4172								
.01655	.53201		.0839	.0186	.02793	.07734	.25658	.5067	36.6803	3.30542	.31509	.01682	.13701	.04325	.06212	.09108	
	.1893					.35228	.02859	.1011	4.63332	27.771	.6962						
											40.709						

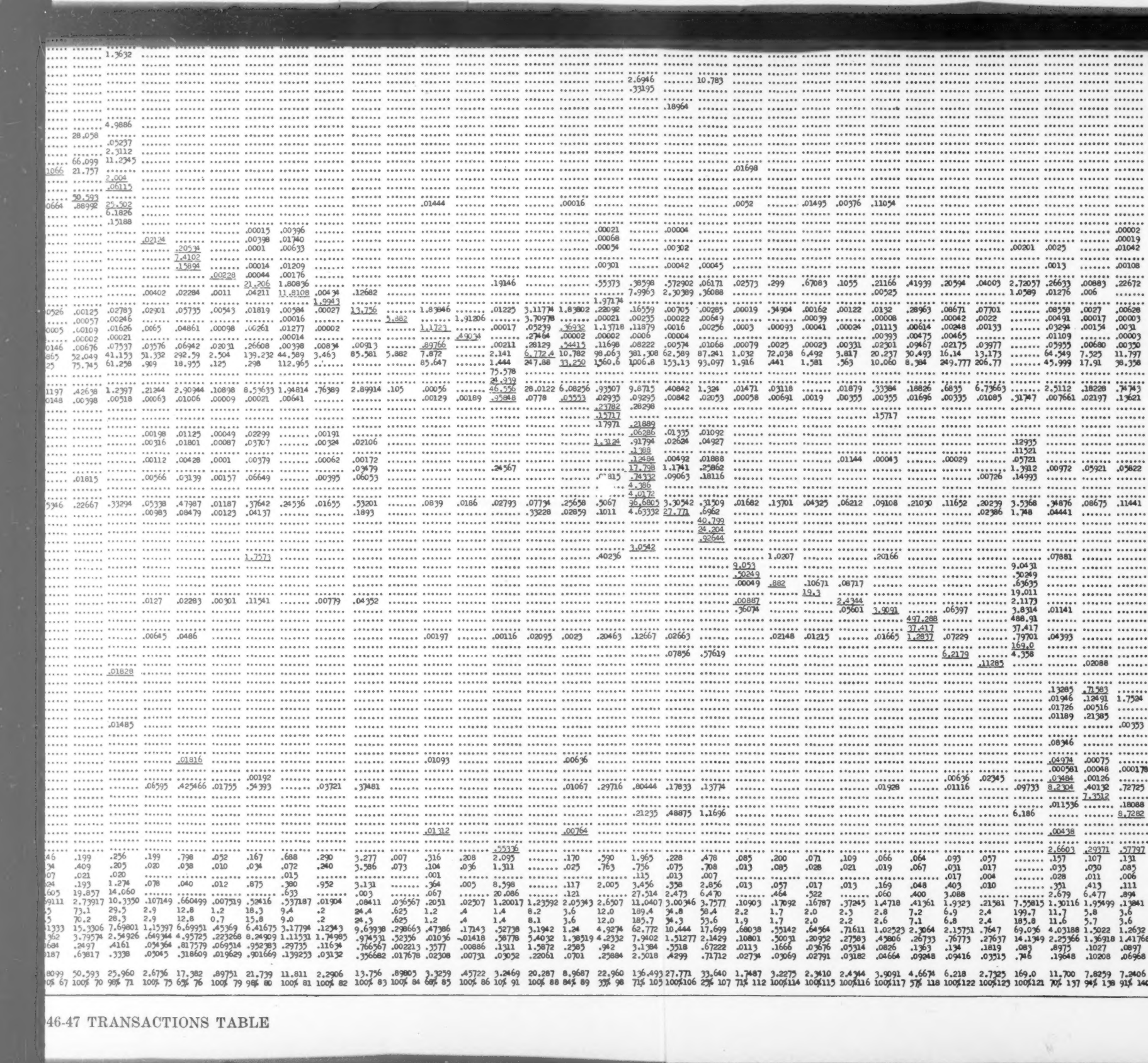
	39. Cloth-ing	40. Special textile	41. Copper	42. Lead-zinc	43. Tin	44. Other mining	45. Nonferr rolling	46. Iron mining	47. Black coal	48. Brown coal	49. Coke works	50. Briqu-etting	51. Mineral oils	52. Electricity	53. Gas works	54. Steel making	55. Engin-eering	56. Radio, electrl	57. Motor vehicle	58. Fibrous plaster	59. Cement	60. Asbeste cement	61. Cement goods	62. Carbide etc.	63. Brick works	64. Pottery glass	65. Glass bottles	66. Build-ing	67. Chemic-als	68. Pharma-ceutical	69. Paints	70. Ve-le

.	69.	70.	71.	72.	73.	74.	75.	76.	77.	78.	79.					
rma-tical	Paints	Vegetable oils	Animal oils	Soap	Fertil-izer	Railway	Road transpt	Airways	Ship-ping	Commer-ce	Other Services	Imports	Exports	Stock rise	Household demand	Excise etc.fn
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.176	-9.9344	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.2556	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.064	1.061	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.77213	.....	.09961	1.707
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.2676	.....	1.2053	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	690.00	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.388	.....	37.212	.56
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.01153	.10298	.....	12.0678	.56
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.00776	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.07538	-.01089	.22754	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.08274	.01566	.32403	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.00858	-.00409	.0229	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.00327	-.00015	.04254	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.21	54.484	-14.333	16.767	.66
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	222.598	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	60.666	-2.215	77.101	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23.9972	-2.241	20.1478	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44.138	-1.532	25.015	.407
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11.617	.991
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.845	-.18527	4.9434	.....
....	.....	.029	.....	.....	.....	.....	.....	.....	.....	.....	.....	.06819	1.4397	.....	34.3234	.195
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.10888	.005375	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	-.00038	.009	.....	.18811	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.01656	.00692	.....	.10854	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.04637	15.0132	.....	121.183	2.724
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.66	2.910	.....	40.5519	.93
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.02421	1.0289	5.8069	121.074	27.255
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.00325	2.7259	5.9385	8.13736	.312
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.17776	.61665	.09647	1.78886	6.735
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19.9102	.....	-3.1484	.....	8.951
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.85776	.81477	.....	30.4426	20.849
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	51.187	.....	.73733	50.449	.757
.046	.....	.....	.....	.00761	.....	.008	.....	.....	.985	2.5173	1.04378	12.7619	1.0839	19.976	2.426
.854	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.95385	8.6801	-1.9336	49.019	.167
....	.00788	.....	.....	.....	.....	.....	.....	.....	.....	.....	.01353	-.00921	.071621	.....	6.6838	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	62.940	.011	7.6276	.....	.005
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.01303	.00558	-.00884	.....	.....
....	.....	.....	.....	.....	.....	19.540	.....	.....	.....	.....	.....	132.781	26.986	-48.984	.09131	.566
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.12328	.12358	.09598	.08730	.009
.855	.36464	.....	.06026	.....	.....	.....	.....	.....	.....	.57303	.....	.2296	.0004	-.16634	.....	.015
....	.....	.....	.....	.....	.....	.01394	.0061	.00523	.01045	.47211	1.29957	.07818	.11304	.....	17.825	2.43
....	.....	.....	.....	.00686	.....	.00049	.00005	.00014	.00017	.03052	.01375	.03626	.00104	-.01899	.....	.071
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.16418	.00034	.....	.....	.029
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.00619	.0007	.....	.....	.024
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.01493	.....	.....	.....	.....	.....
.355	.24404	.....	.....	.29743	.....	.20108	.06227	.04672	.02831	5.2963	18.8048	1.78	.7263	.....	14.7795	2.476
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.1284	.85014	.002	.0095	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.48491	.....	-.01009	.....	.509
....	.....	.....	.....	.....	.....	2.417	354.12	5.8	.....	256.18	4.349	67.507	183.93	.....	765.76	.973
....	.....	.....	.....	.....	.....	.418	225.58	.418	.....	150.39	.....	.....	.....	.....	382.157	.....
....	.....	.....	.....	.....	.....	.00175	.20498	.00175	.....	.22592	1.6379	.3584	.19487	.....	1.9626	.416
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.031	18.190	-11.837	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.182	2.538	-1.5144	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.010	13.230	.....	.....	.....
....	.....	.....	1.8298	.....	.....	.....	.....	.....	.....	.....	.....	2.099	2.833	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	-.235	4.577	.....	2.1657	.306
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.464	10.919	.....	3.3444	.5
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.3662	.2789	.....	6.0722	.772
....	.....	.....	.....	.....	.....	.01715	.....	.....	.00572	.....	.....	-.038	.616	.....	28.091	.01
....	.....	.....	.....	.....	.....	.01234	.00402	.00344	.00896	.14311	9.4749	7.252	1.1418	.....	15.7649	4.662
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.697	1019.45	-480.24	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.324	155.046	-29.011	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.512	1.6671	9.8439	.33368	18.6392	.341
....	.....	.....	.....	.....	.....	.07686	.00507	.03379	.0625	.....	.....	.425	1.270	.....	14.6333	.482
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	42.1857	.04290	7.1744	.....	.104
....	.....	.....	.....	.....	.....	.....	.....	.....	.029	.431	9.6482	114.657	5.9529	-14.0	63.2535	1.115
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	102.156	.19084	3.6214	23.241	.895
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.012	2.016	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.347	.107	.....	.....	.005
....	.....	.....	.....	.000878	.70917	.06943	.00608	.00781	.02256	.17617	.25949	.33846	1.60278	.....	48.7876	1.4
....	.....	.....	.....	.....	.....	.29237	.....	.04017	.00834	.10692	.81644	11.7473	19.0676	2.84705	1.18532	18.1632	2.211
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.1988	1.560	8.227	-1.5988	.....	.....
....	.00002	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.93381	.....	.....	.....	.....	.....
....	.00019	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.0048	.0003	.0001	.....	.005
....	.01042	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.00112	.00012	.....	.....	.008
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.179315	.00111	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.2109	-.02651	1.13757	4.9352	.....
....	.00108	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.130259	.00988	.....	.001
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.0001	.....	.....	.....
.0883	.22672	.....	.....	.01639	1.1131	.18912	.....	.....	.....	.....	.....	3.00005	2.0845	.....	10.361	.023
.06	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.0464	.49048	.....	.....	.035
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.02258	.....	.....
.027	.00628	.00544	.05693	.02296	.00281	4.007	.....	.....	.473	.....	.....	.001	.450	-1.0027	.607	.....
.0017	.00003	.00098	.00038	.00329	.0075	.....	.....	.....	.....	.....	.....	.....	.....	.01554	.....	.....
.0154	.0031	.0002	.00056	.00687	.00142	.....	.....	.....	.....	.....	.....	.00059	.....	.008	-.47762	.379
....	.00003	.....	.00691	.0003	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.10224	.....
.0680	.00350	.00223	.03758	.01673	.02135	.26489	.....	.....	.....	.05281	.....	.....	.....	.....	.76958	3.57209	.....
.525	11.797	5.777	12.495	5.495	35.121	.....	27.374	4.614	62.745	879.57	310.661	.....	.....	.....	.....	2,549.3	.....
.91	38.358	2.326	.135	3.031	1.200	.....	.....	.....	.....	394.81	1145.76	.....	.....	.....	.....	26,694	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	61.055	.477	-13.0	.....	.001	.....
.8228	.74743	.00531	.09968	.67688	.5111	26.505	5.148	.....	13.0	.....	28.262	225.93	14.370	-11.882	24.0	.....	.....
.2197	.13621	.00066	.0017	.00071	.00423	.1444	.50851	.15573	.04417	.36978	.51213	1.3272	.104	.....	1.4815	.993	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.134	-.17958	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.001	.029	.01089	.....	.002	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.002	.....
....	.....	.....	.....	.....	.....	.00084	.....	.....	.....	.....	.....	.13837	.20126	.04252	.....	.442	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.001	.025	.....	.....	.008	.....
....	.....	.....	.....	.....	.....	.00035	.....	.....	.....	.....	.....	.001	.006	.....	.....	.018	.....
.3921	.05822	.05748	.07474	.00044	.....	.01955	.....	.....	.01066	.08884	.25104	.266	.104	.....	4.8158	.953	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.03684	1.738	.460	.....	.66495	.717	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.774	.317	.....	9.843	.204	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.434	.837	.....	3.6137	.057	.....
.8675	.11441	.03566	.09292	.09387	.20636	4.1329	.00702	1.7397	1.6203	.49299	.792	19.7758	4.9686	.....	79.4991	4.261	.....
....	.....	.....	.....	.....	.02336	.01035	.00467	.00156	.00623	.18123	4.39463	4.8383	.8625	.88026	17.828	1.882	.....
												15.567	.992	.768	25.436	2.198	

53	Sheepskins	m.																	
54	Rabbitskins	m.lb	14.764																
55	Other hides	m.		4.7141															
56	Heavy leather	m.lb																	
57	Light leather	m.sq.ft																	
58	Leather goods	£m																	
59	Footwear (index)	m.pr																	
60	O'r manufactures	£m																	
61	Greasy wool	m.lb	844.57																
62	Scoured wool	m.lb																	
63	Wool fabric	m.sq.yd																	
64	Knitted goods	£m																	
65	Raw cotton	m.lb																	
66	Cotton fabric	m.sq.yd																	
67	Synthetic fabric	m.sq.yd																	
68	Flax fibre	'000 ton																	
69	O'r yarns	m.lb																	
70	Clothes	£m																	
71	O'r textiles	£m	3.1538		1.5212											.07961	.00721	.01426	
72	Wool wastes	m.lb																	
73	By products	£m																	
74	Aluminium	m.ton																	
75	Copper	m.ton																	
76	Lead	m.ton																	
77	Silver	m.f.oz																	
78	Zinc	m.ton																	
79	Tin	m.ton																	
80	O'r minerals	£m																	
81	Non-ferrous goods	£m																	
82	Iron ore	m.ton																	
83	Black coal	m.ton		.03361	.00241	.00624	.04225	.00156	.02640	.00184	.0073	.10364	.01581	.02873	.09028	.016
84	Brown coal	m.ton		.00354	.00011		.01074					.00101			.00061	.002
85	Coke	m.ton		.00457	.02241	.00348	.00181		.00039	.00022	.00074	.00157	.00087	.00096	.01782	.003
86	Briquettes	m.ton		.00015	.01087	.00087	.04314			.00003	.0004	.00221	.00133		.00146	
87	O'r fuels	£m	1.1198	.03043	.20377	.00527	.12988	.03017	.02516	.00329	.00133	.01282	.02365	.0406		.021
88	Electricity	m.kwh		90.855	33.82	4.299	42.631	2.705	11.941	13.294	3.736	20.755	14.157	2.9239	1.81808	20.9
89	Coal gas	m.cu.ft		64.818	145.073	211.552	1.640	.16318		7.424	.526	2.744	6.154	7.646		61.3
90	Crude petroleum	m.gal														
91	Petrol	m.gal	78.902													
92	Fuel oil	m.gal	73.73	1.1622	1.8355	.13839	1.1794	.06311	.42431	.13834	.02622	.18332	.10808	.26974	.15431	.366
93	O'r min. oils	£m		.00933	.00539	.00046	.01432	.00131	.0033	.00112	.00023	.00451	.00151	.01227	.00409	.001
94	Pig iron	m.ton														
95	Slag	m.ton														
96	Scrap	m.ton														
97	Ferrous castings	m.ton														
98	Steel ingots	m.ton														
99	Ferrous pipes	m.ton														
100	Ferrous wire	m.ton		.00202												
101	Sheet metal prod.	£m	.52815		.01429	.01245	.01236		.11229	1.1068	.00051	.04733	1.8993			.09979	.057
102	Cutlery	£m	.17179	.00302									.01815			
103	Tractors	'000														
104	Agricult. mach.	£m														
105	Misc. machinery	£m	4.9547		.21645	.2299	.03888	.21860	.03642	.07045	.13254	.01482	.19734	.05111	.20474	.06452	.133
106	Electrical goods	£m			.02436	.02568		.02929					.02569		.03056		
107	Motor vehicles	'000														
108	Vehicle repair	£m														
109	Motor accessories	£m														
110	Arms	£m														
111	Limestone	m.ton														
112	Plaster sheets	m.sq.yd.														
113	O'r plaster	£m														
114	Cement	m.ton														
115	Cement sheets	m.s.sq.yd														
116	O'r cement goods	£m	.11491													
117	Quarry products	£m	.12273													
118	Bricks, clay	mil														
119	Tiles, clay	mil														
120	O'r bricks	£m														
121	Buildings	£m	5.0													
122	Pottery, glass	£m														
123	Glass bottles	m.ton	.00881													
124	Oil seeds	m.cwt	.45613													
125	Carcasses	£m	.82205													
126	Essential oils	m.lb										.08692				.15
127	Vegetable oils	m.gal											1.3754			.14
128	Tallow	m.cwt											.32647			
129	Animal oils	m.lb	.99266			4.5194	4.4295						3.8287	11.554	5.1345			
130	Animal byproducts	m.cwt	.75964									.00221		.13876	.00201			.00
131	Soap	m.cwt														
132	Crude salt	m.ton														
133	Phosphate rock	m.ton														
134	Sulphuric acid	m.ton														
135	Ref glycerine	m.ton				.00012	.00012									
136	Alkali	m.ton	.00028													
137	O'r chemicals	£m			.02255	.00124	.00214									
138	Pharmaceutical	£m														
139	Paint pigments	m.cwt														
140	Paints	m.gal														
141	Superphosphate	m.ton	1.1222													
142	Ammon.sulphate	m.ton	.0488													
143	O'r fertilizers	'000 ton	149.19										.15914	8.647	1.262			
144	Byproducts	£m																
145	Railroad services	£m	10.94	.479	1.463	.19	.078	.592	.165	.056	.029	.029	.112	.047	.261	.041	.21
146	Road transport	£m	6.155	2.123	.186	.056	.019	.03	.01	.01	.012	.009	.102	.009	.012	.015	.05
147	Air transport	£m	.201		.018	.007	.005	.01	.005	.01	.004	.003	.036	.008		.005	.00
148	Shipping	£m	5.065	.293	.152	.005	.015	.075	.038	.019		.037	.12	.02	1.568	.244	.02
149	Commerce	£m	63.767	.29	3.116	8.248	1.166	3.177	.878	.947	.802	.352	1.473	2.154		1.524	2.9
150	Other services	£m	2.0259	.017	1.0285	2.5071	.57406	.522	.0856	.45872	.17	.06371	.52862	.1929	.39609	.29292	1.
	Employment	'000	357.7	29.8	7.6	24.7	3.7	6.3	1.2	1.7	1.5	.6	8.1	2.8	4.3	2.0	7.4
	Employees	'000	155.1	19.3	7.5	20.2	3.7	6.3	1.2	1.7	1.5	.6	8.0	2.7	4.3	2.0	7.4
	Labour income	£m	79.085	11.663	2.5506	6.8037	.94009	2.0733	.35934	.59222	.45824	.22204	2.9658	.90209	1.4444	.61887	1.5
	Nonlabour income	£m	148.022	12.784	1.4449	2.12	.51139	.64083	.13495	.18083	.80539	.19207	.70613	.3181	.91065	-.00165	1.1
	Depreciation	£m	16.5	.17805	.2385	.1836	.0589	.37095	.04686	.10066	.0847	.0193	.1977	.0522	.3335	.105	.1
	14 Taxes	£m	7.407	.232	.12691	.29493	.04463	.09762	.01676	.02774	.03101	.01162	.12465	.03957	.07312	.02486	.0
Total Cost		£m	312.145	25.048	43.58	25.282	3.9378	27.823	4.4866	7.0366	3.1847	1.9761	11.0795	8.664	12.204	13.172	9.4
Value of main product				28% 57	74% 4	54% 6	88% 7	91% 16	100% 17	97% 18	100% 19	91% 20	66% 14	86% 13	99% 23	98% 24	92

| | | |





46-47 TRANSACTIONS TABLE

			1.8298										.010	13.230					
													2.099	2.833					
													-.255	4.577		2.1657	.306		
													.464	10.919		3.3444	.5		
													.3662	.2789		6.0722	.772		
						.01715			.00572				-.038	.616		28.091	.01		
						.01234	.00402	.00344	.00896	.14311	9.4749	7.255	1.1418			15.7649	4.662		
													4.627	1019.45	-480.24				
													.344	155.046	-29.011				
												.512	1.6679	9.8439	.33368	18.6392	.341		
						.07686	.00507	.03379	.0625				.425	1.270		14.6333	.482		
													42.1857	.04290	7.1744		.104		
										.029	.431	9.6482	114.657	5.9529	-14.0	63.2535	1.115		
													102.196	.19084	3.6214	23.241	.895		
													.012	2.016					
													1.3947	.107			.005		
					.000878	.709173	.32516	.04017	.00834	.10692	.81644	11.7473	19.0676	2.84705	1.18532	18.1632	2.211		
							.29237					1.1988	3.560	8.227	-1.5988				
	.00002											3.93381							
	.00019												.0048	.0003	.0001		.005		
	.01042												.00112	.00012			.008		
														.179315	.00111				
	.00108											1.2109	-.02651	1.13757		4.9352			
														.130259	.00988		.001		
														.0001					
.00883	.22672			.01639	1.1131	.18912							3.00005	2.0845		10.361	.023		
.006													1.0464	.49048			.035		
																.02258			
.0027	.00628	.00544	.05693	.02296	.00281	4.007			.473				.001	.450		-1.0027	.607		
.00017	.00003	.00098	.00038	.00329	.0075											.01554			
.00154	.0031	.0002	.00056	.00687	.00142							.00059		.008		-.47762	.379		
	.00003		.00691	.0005												.10224			
.00680	.00350	.00223	.03758	.01673	.02135	.26489				.05281						.76958	3.57209		
7.525	11.797	5.777	12.495	5.495	35.121		27.374	4.614	62.745	879.57	510.661						2,549.3		
7.91	38.358	2.326	.135	3.031	1.200					394.81	1145.76						26,694		
													63.055	.477		-13.0		.001	
						.69416	41.998	17.273	.337	24.009	21.1646	354.33	.646				194.245	18.884	
.18228	.74743	.00531	.09968	.67688	.5111	26.505	5.148		13.0		28.262	225.93	14.370	-11.882	24.0				
.02197	.13621	.00066	.0017	.00071	.00423	.1444	.50851	.15573	.04417	.36978	.51213	1.3272	.104			1.4815	.993		
													.134	-.17958					
													.001	.029	.01089		.002		
						.00084											.002		
													.1837	.20126	.04252		.442		
													.001	.025			.008		
						.00035							.001	.006			.018		
.05921	.05822	.05748	.07474	.00044		.01955			.01066	.08884	.25104		.266	.104		4.8158	.953		
												.03684	1.738	.460		.66495	.717		
													5.774	.317		9.843	.204		
													.434	.837		3.6137	.057		
.08675	.11441	.03566	.09292	.09387	.20636	4.1329	.00702	1.7397	1.6203	.49299	.792		19.7758	4.9686		79.4991	4.261		
					.02336	.01035	.00467	.00156	.00623	.18123	4.39463		4.8383	.8625	.88026	17.828	1.882		
											15.567		.992	.768		25.456	3.198		
						.01	2.76	.003		1.104	2.127					18.20			
						.00155	.37291	.00078		.18413			14.076	.751	9.2484	4.4237	2.646		
													3.571	1.885		4.7398	.382		
					.03877														
													-.010						
						.0156							.002	.038					
													-.014	.275					
													.00025	.00568					
													.71388	.11296	.060				
						8.0948							.003	.281					
													.185	.032			.035		
												31.064				132.94			
.02088									.00752	.03063		.16346	2.993	.3285		2.8938	1.195		
											.01121		.00075	.00183	.00159		.4		
		.67259										.31216	.635	.0016	.08325				
			.76335		.06679								.153	.111	.034				
.71583				.30001									.446	1.791	.0205		.275		
.12491	1.7524	3.7160		.69429								.36802	.929	.062		.09435	.359		
.00516			.91408	.76894		.08659								.21670	-.50452				
.21385			6.9118	.21101									3.554	6.235		16.616	.003		
	.00353											.33385	.014	.033	.17769		.282		
				1.5115		.0006						.01257	.02410	.00238	.11994		1.1931	.917	
													.003		.01853				
					.69786								.723		.02548				
.00075					.014039										.03582				
.00048	.000178			.00172								.00005	.00005	.00087	-.00066		.084		
.00126				.01321								.0044	.022		-.00576	.0003	.316		
.40132	.72725				.18871	.00932	.0028	.00186	.00932	.06987	3.01122	4.9445	1.2865			2.7216	3.532		
7.3512												1.53046	1.9174	1.7204	.08026	5.9374	1.468		
	.18088											.02467	.3293	.097	.01521		.034		
	8.7282					.00585				.0538		.03041	.088	.237	-.29794		.011		
													.00397	.00025	-.03122				
					1.0872							.001	.028	.00012	-.01205				
					.01485														
.29371	.57797			.16693	123.72								9.989	.539		10.823			
.107	.131	.025	.015	.074	.857	71.908						5.06316	.31472	.63231					
.030	.085	.030	.021	.054	.651		38.767					2.905				32.489			
.011	.006	.004		.006	.008			7.346				.864				17.005			
.413	.111	.075	.081	.043	1.921				28.318			1.9021	1.53013			6.116			
6.477	.894		.135	1.782	.544						300.273	2.835	28.918	7.289		1.865			
1.95499	.13841	.51706	.66593	.85899	.13039	.556	.405	.224	3.850	19.477	330.124					3.524			
5.8	3.6	0.6	1.5	3.2	3.5	104.0	48.9	8.7	44.6	494.6	412.8					256.194	-22.968		
5.7	3.6	0.6	1.5	3.1	3.5	104.0	44.8	8.7	44.3	434.7	356.4								
1.5022	1.2632	.19965	.51828	.96113	1.2852	48.370	15.968	2.301	15.751	147.196	120.624					93.354			
1.36918	1.41768	.07097	.5127	.46165	.33239	7.818	4.765	-.366	5.451	92.226	94.541					4.143			
.1027	.0897	.0502	.0556	.0718	.1846	.440	1.017	.535	1.464	7.305	11.639								
.10208	.06968	.00935	.0276	.05676	.05579	1.02	3.28	.099	.466	7.529	19.424					7.835			
7.8259	7.2406	2.4732	3.0601	5.2075	7.2033	71.908	38.767	7.3460	28.318	300.273	330.12								
94% 138	91% 140	100% 127	48% 128	93% 131	80% 141	100% 145	100% 146	100% 147	100% 148	100% 149	100% 150								

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among industries. The two approaches—one filling in columns, the other completing rows—are complementary. However, because of the absence of a set of consistent statistics, some item must be chosen as residual or balancing item if we are to ensure that a row or column sums to the total determined in the manner described in the preceding paragraph. In the 1947 table, columns were normally completed by using "services" as the balancing input. Rows were normally completed by using as balancing item either final home demand, stock change or "services"—although other methods were employed, e.g. the construction industry was treated as the residual purchaser of building materials, the farm sector as the residual purchaser of grain and fodder. It will be noted that the services sector in effect includes a dummy industry: an industry which buys commodities, the sales of which are otherwise unidentified, and sells them off as a mixed bag of goods to all industries who have made purchases which are otherwise unidentified.[7]

A useful method of making a final check upon the accounting consistency of the transactions table is to consolidate it. In this form it becomes obvious whether the statistics satisfy the basic property of such tables: the equality of total market expenditure and total market supplies. Table I is such a consolidated table for 1946-7.

TABLE I

Consolidated Transactions Table, Australia, 1946-7

Producer's values £m.

Sales of	To All Industry	To Final Home Demand	To Exports	Total Sales
Commodities	1,028	1,329	309	2,666
Excise, etc., taxes	34	82	1	—
14 taxes	53	8	—	—
Factor incomes	1,262	97	—	—
Depreciation	60	—	—	—
Value of output	2,437	—	—	—
Imports	229	—	—	—
Total supplies	2,666	—	—	—

Notes: 1. Commodities sold include transport and commercial services.
2. For definitions of taxes refer end of Section 2.
3. Factor incomes includes all labour and non-labour incomes. G.N.P. is £1,597m.

2. *The Modified Table*

The fold-in table is a 1946-7 transactions table which has been modified to the extent that transport and commercial services are

7. In the 1946-7 table, unidentified purchases of all industries were around 6½ per cent of total costs of all industries.
In the work-sheets the final balancing operation was the balancing of this dummy industry itself by selling £0·28 million of refined silver to it, the residual in this silver row (as in the gold row) being final demand.

treated in a special way (see below). The main characteristics of the table are that: it is oblong (because some industries produce several commodities); quantities rather than values are given wherever possible; the sales to industries are on current account only—all purchases on capital account being included in the home final demand column.[8] Except for the entries in the transport and commerce rows, all statistics in the table are precisely the figures which would be entered in a transactions table of standard type drawn up at producer's values.

The basic conception of a transactions table is that in each row we have the *ex post* identity of the total supply with the sum of demands for the commodity, i.e.

$$X_1 + M_1 = x_{11} + x_{12} + x_{13} + \ldots + y_1 \ldots\ldots\ldots\ldots \quad (1)$$

where X_1, M_1 are respectively home production and imports of commodity 1, x_{12} is the input of the commodity into industry 2 and y_1 is the final demand (including exports and stock change) for the commodity. If we use the notion of an average input coefficient a_{ij}, defined by the equality

$$x_{ij} = a_{ij} \,.\, X_j, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

we may rewrite the first equation in the form

$$X_1 + M_1 = a_{11} \,.\, X_1 + a_{12} \,.\, X_2 + a_{13} \,.\, X_3 + \ldots\ y_1. \quad \ldots (3)$$

Now for most goods and services this is a useful approach to the study of commodity flows because normally one *can* obtain statistics on the rate of input x_{12} and perhaps also obtain some independent expert opinion as to the probable size of the average input coefficient a_{12}. But in the case of transport and commercial services there are no statistics on their rate of input into other industries nor are we in a position to give readily a numerical value to the average rate of input of, say, railway services into the brewing industry. For example, if commodity r is railway services and commodity 3 is beer, then a_{r3} is the input of railway services used by the brewing industry per gallon of beer—and this can be ascertained only by specifying the railway services required for that amount of each of the raw materials which is required to manufacture a gallon of beer. More generally as statistics on rail charges are available only in the form of a list of total rail charges for the transport of each commodity, the set of coefficients a_{rj} can be ascertained only by allocating the rail charges by commodity horizontally along the rows of the transactions table, and finally collecting them vertically down all the columns. This is a major operation which, apart from any doubts as to its efficiency, is quite expensive. Fortunately, it

8. Attention may also be drawn to the following specific points: (a) In the non-ferrous metal industries, the mining, concentrating and refining activities have been aggregated. Hence there is a copper "industry" producing a commodity, the entire output of which is measured in terms of *recoverable* copper content. (b) Cotton yarn has been included with raw cotton and measured in raw cotton equivalents. (c) Wool yarn has been included with fabric and measured in wool fabric equivalents. All these arrangements have been designed to facilitate later computation.

is completely unnecessary if we use a different concept of "railway coefficient"—one which is more appropriate to the type of statistical data available.

Instead of the coefficient a_{r3} meaning the input of railway services used (complementary to the materials inputs) by the brewing industry per gallon of beer at the breweries, a_{r3} will now be taken to mean the amount of railway services required to handle the distribution of one gallon of the available supplies of beer from the importers and breweries to the public. Likewise x_{rj} is now the amount of railway services required to handle the distribution of the available supplies of j. In short, in the case of transport and commerce inputs the a_{ij} coefficients (and the x_{ij}) are given a different meaning from the normal. It may be convenient to think of the relevant a_{ij} for these activities i as "handling" or "distribution" coefficients.

So far then it has been decided to treat transport and commerce services in terms of the concept of distribution coefficients instead of input coefficients. However, in the previous paragraph we went only to the point of discussing distribution coefficients on *commodities* (such as beer). In practical investigation the most useful concept is that of distribution coefficients on the outputs of a *process* or industry. (This re-ordering of distribution charges on a process basis is necessary in order to bring the demand for distribution services into the scope of subsequent input-output analysis.) Hence we reach our final definition of x_{rj}, as the rail transport services in distributing to purchasers the total product of industry j along with competitive imports.[9] The row for rail services now states that the total supply of such services equals the total of handling services on distributing commodities from factories and wharves together with the direct demand for passenger services by final consumers.

It is worth stressing that the table we obtain using the distribution coefficient concept is not a standard transactions (or input-output) table inasmuch as a column in our table no longer gives us the cost structure of the industry because in the rows for distribution services we have written handling charges on output instead of payments made for the input of such services.[10] But it is of course possible to complete the cost structure of any industry if required, by drawing on the

9. Competitive imports have to be included in order that the demand for say rail services arising from the existence of imports can be brought into subsequent analysis. Justification for the method employed rests on the assumption that the volume of competitive imports bears a known relation (the "import coefficient") to home production. Similarly where an industry produces not only its distinctive "major" product but also some by-product or "minor" commodities, the level of output of the minor commodities is held to be determined by known by-product coefficients. Hence the handling charges on these minors are included as part of the handling charges on the product of the industry.

Non-competitive imports present a special problem discussed below in footnote 15.

10. None of this affects the figure for total costs or the balancing of the table since inputs are generally available at purchasers' values and hence, on grounds of economy, columns were balanced using those values. i.e. the column *totals* were exactly what they would be in a producers' values table of the standard type.

original tabulation of distribution charges by commodity. The advantages of the present method, as used in the 1946-7 table, lie primarily in its cheapness.[11]

We should mention here that non-income taxes are treated in two ways in recorded statistics. First there are excise, customs, sales and flour taxes which are distinguished by the fact that they are included in the price at *purchaser's* value of the commodities and raw materials purchased by industry. Although these taxes, along with transport and commerce charges, constitute the difference between purchaser's and producer's value, the re-ordering of such taxes on a process basis has not been done and the original figures on a commodity basis are shown in the last column of the fold-in table.[12] (However this does not affect the balancing of the table in the usual way—see footnote 10.) Second, there are fourteen taxes which enter into the current accounts of industries as direct costs and so are included in the *producer's* value of output. These "14 taxes" are: rates, land tax, motor taxes, other taxes, stamp duties, licences and payroll tax, together with liquor licences, wool levy, entertainment, racing, gold, lottery and wheat taxes less subsidies such as the various subsidies to primary producers.

3. *Internal Sales*

An "internal sale" exists when an industry both produces and uses the same commodity. In input-output analysis it is usually convenient to net out internal sales since this reduces the number of coefficients in the calculation.[13] However, in the original compilation of a transactions table it is almost inevitable on accounting grounds that we should endeavour to specify all internal sales.

An internal sale may appear in a transactions table in any one of three ways. First when a commodity is produced and used in own works official data are provided on such internal sales within the factory.[14] Second is the case in which factory A sells to factory B (whether owned by the same firm or not), both factories being included by the Commonwealth Statistician in the same official industry subclass. No official

11. Re-ordering handling charges on a process basis involves no work at all if there are no joint products and very little work if there are.

A further advantage is that in an open input-output model the customary treatment of, say, rail services requires that the final bill of goods include not only the final demand for passenger transport but also the final demand for rail services regarded as a complementary commodity to all other commodities in the bill of goods (i.e. rail charges from the final producer to consumer.) It is difficult to estimate such a figure with accuracy—and the present method completely eliminates the need for such an estimate since the demand for rail services is determined by handling coefficients on the output of each process and not by "input requirements" into the final demand sector.

12. Such a re-ordering would relate only to the tax structure prevailing in 1946-7.

13. Eliminating internal sales means for example that as blast furnaces are here aggregated with open hearth processes, pig iron is almost wholly an intermediate commodity (except pig made into castings) and is eliminated. Similarly as sulphuric acid production is perforce aggregated with fertilizer production, most acid is eliminated as an internal sale

14. Such data are provided under the head "own use" in Table 80 of the 1953-4 *Secondary Industries* bulletin—but they are excluded from Table 56.

information is provided on such internal sales and it is difficult to infer their magnitude with any accuracy. Third is the case in which a factory in one official subclass sells to a factory in another official subclass, but the two subclasses have been aggregated in the transactions table. Such sales are generally easier to identify. In the final stages of the compilation of the 1947 table it was found that in several industries there were unidentified costs and unidentified outputs of about the same value. This strongly pointed to the existence of internal sales which had not previously been identified, and in the fold-in table these have been netted out along with all other internal sales.

Internal sales are netted out at *purchaser's* value—the value of output being reduced not only by the producer's value but also by the handling charges on the input. These charges on the internal sales must be added to the handling charges on the product of the process from which the internal sales are eliminated. Hence the purchaser's value of the product of the process, to the users of the product, is unchanged—but the producer's value is less than before by the amount of those handling charges on the internal sales. The necessity for this approach is made plain by consideration of those cases in which cancellation of internal sales completely eliminates a commodity, e.g. the aggregation of copper mining-concentrating with copper refining gives us an integrated industry which may be producing and using equal amounts of copper concentrate. Internal sales elimination would then cause this commodity to disappear—and if the cancellation were carried out at producer's value the question would arise: what is to be done with the handling charges on the now non-existent commodity? The only satisfactory answer is that these charges be added to the handling charges on refined copper, while supplies of refined copper at producer's value are simultaneously reduced by the amount of these extra charges.[15]

4. *Conclusion*

Perhaps the most important function of the Transaction Table is that it provides an acid test of the efficiency of a nation's economic statistics.[16] The 1946-7 table points clearly to the need in Australia for a single standard industrial classification. A standard commodity classification is scarcely less important. The table also points to the

15. An apparently alternative approach to the problem is to say that, since in the final matrix transport charges are to be classified by process, then the handling charges on copper concentrates should be regarded as charges on the output of the process. This approach of course leads us to the same conclusion as before.

An analogous technique is needed for intermediate commodities which were not produced in Australia (viz. tinplate, phosphate rock, crude petroleum, crude rubber, aluminium, raw cotton). The handling charges on these commodities are regarded as handling charges on the product of the process using these raw materials—in an analogous fashion to the way in which handling charges on copper concentrate were moved on to the product of the aggregated concentrating-refining process. This approach is necessary in order to bring all demands for handling services within the scope of input-output analysis. Tea is also not produced in Australia but, it being a final commodity, handling charges on it are treated as part of final demand.

16. Cp. *The Inter-Industry Flow of Goods and Services, Canada 1949*. Reference Paper No. 72, Dominion Bureau of Statistics, Ottawa, July 1956. Preface.

desirability of regarding all economic series as being part of a single accounting structure in which the accounting relations between all series are clearly defined.

This approach immediately raises a variety of points. The comparative excellence of the annual factory census underlines the lack of comparable data over most other fields of industry. Of the factory census itself we should consider: whether the treatment of assembly and commission work is satisfactory; whether the "other materials" used column in Table 56, which is rarely exhausted by Table 80, could not be subdivided at least into the usage of 15 commodity groups produced by the industrial classes (excl. power); and whether we could not be shown, on a detailed commodity classification, the production of individual commodities by each industry subclass, equal in sum to the value of output of the subclass.

All this is of course little more than a plea for consistent statistics. Perhaps this plea is best made by drawing attention to the ease with which the factory census could be drawn up in the accounting form of a transactions table.

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NOTES TO 1946-7 TRANSACTIONS TABLE

1. Purchases are in normal type, supplies are shown underlined. (Strictly speaking the underlined entries make up a second table of "sources of supplies" which is here superimposed on the transactions table for reasons of economy.)

2. The bottom row is intended to give a clearer idea of the significance of our industrial classification. For example, at the bottom of the second column, 28 per cent 37 means that commodity 37 (logs) accounted for 28 per cent of the value of output (*equals* total cost) of industry 2.

3. The large negative entry at the end of row 150 refers to price stabilization subsidies.

4. "Employment" is the sum of employees and working proprietors. "Labour income" includes a wage imputed to those proprietors.

Correction.—In the last row of the Table, the following three corrections should be made: In column 28, for 47 per cent read 49 per cent; in column 51 for 10 per cent read 34 per cent; in column 73, for 80 per cent read 85 per cent.

COMPANY MERGERS IN AUSTRALIA 1946-56*

1. *Description of the Study*

The large number of company mergers has been one of the outstanding features of post-war industrial and commercial development in Australia. This article discusses the reasons for mergers, the extent of merger activity in terms of value and number, and the effects of mergers on competition and the growth of large firms. Essential facts on 673 mergers which occurred between January 1947 and October 1956 have been analysed.[1] Our investigation indicates that most mergers have helped create more efficient and better managed businesses while only a few mergers have reduced competition.

A merger occurs when the rights to control two groups of assets which are organized as income-producing units and which were previously controlled by separate groups are brought under the control of a single group. The central concept is the right to control which is defined conservatively as ownership of at least 50 per cent of the voting shares. If the group owning the majority of the voting shares after the merger is dominated by the same shareholders as either of the groups owning the separate firms involved, the merger is termed a take-over; one policy-control group has added the assets of another to the assets it already controlled. If the resultant ownership group is a combination on a somewhat equal footing of the groups owning the separate firms before the merger, the transaction is an amalgamation. Take-overs are split into three groups. Complete take-overs involve the acquisition of full ownership of a firm.[2] The merger is a take-over of assets only if the assets acquired were not organized as a firm. In the third group, take-overs without acquisition of full ownership, the ownership rights outstanding were ordinary shares in 24 cases, preference shares in 16, and both in 6.

Value of Mergers.—Table I shows the distribution by value and year of firms taken over or amalgamated. In terms of total value the few largest mergers dominate the picture. The 23 mergers of more than £1,000,000 (3·4 per cent of all mergers) were valued at £65,470,000 or forty-six per cent of the value of all mergers. When the 34 mergers valued at £500,000 to £999,000 and worth a total of £23,362,000 are added, the biggest 57 mergers (8·5 per cent) account for 62 per cent of the total value. However, small mergers can be as important as large

* This article reports the findings of a detailed study of post-war Australian company mergers. I am indebted to the staff of the Melbourne University Economics Faculty for helpful discussion and criticism and to the U.S. Educational Foundation for the Fulbright Award which made possible my research in Australia.

1. The lack of public information made it impossible to find data on many mergers; the sample is biased in favour of large mergers, those involving public companies, especially listed companies, and mergers which took place in most recent years.

2. A proprietary or public company, a sole proprietorship, or a partnership.

TABLE I

Value of Firms Taken-over or Amalgamated

Value of Firms	Number of Firms										
	Total	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956a
(1) 0— 9,999	54	4	3	8	13	7	2	12	2	1	2
(2) 10,000— 49,999	253	10	15	18	29	28	21	21	42	49	20
(3) 50,000— 99,999	133	8	6	14	15	24	4	7	19	23	13
(4) 100,000—249,999	125	6	2	12	13	12	12	15	14	24	15
(5) 250,000—499,999	51	3	6	3	3	5	3	5	7	6	10
(6) 500,000—999,999	34	—	1	4	1	4	1	1	3	10	9
(7) 1,000,000—and over	23	1	1	—	2	4	1	2	3	8	1
	673	32	34	59	76	84	44	63	90	121	(70)

a. Incomplete; no statistical material was collected after September 1956. Even the coverage of the second half of 1955 suffers from the fact that some company reports for 1955-6 were not available.

mergers in causing industry concentration, increasing efficiency, and decreasing competition.

Take-overs valued at less than £10,000 were only included when there was a special reason such as concentration of an industry or growth of a particular firm through many small mergers. Many mergers worth between £10,000 and £100,000 were not located, but the only mergers worth more than £100,000 not covered were take-overs of one proprietary company by another. There probably were not many high value mergers of this type because the shares of a proprietary company do not have an established market or price and would not usually be acceptable as payment in a merger transaction. Also many of the fastest growing and largest proprietary companies converted to public status. Virtually all mergers worth more than £250,000 were studied.

The two major problems in valuing mergers are finding the payment actually made and valuing shares issued. The first problem is especially serious for take-overs of small proprietary companies and unincorporated businesses.[3] Conservative estimates were made in placing mergers in the value classifications used in Table I. The shares issued in merger transactions were valued at the price at which similar shares changed hands on the Stock Exchanges at the time of the merger.[4]

The meaning of market value.—Given perfect knowledge about the future, the value of a company's shares would be the value of all future earnings discounted to the present by the appropriate rates of interest.[5] Because investors are the only sizable outside group who have

3. Although the exact consideration could not be found for nearly half the mergers, few of these were worth more than £250,000.

4. Because of the irrational, speculative, and chance factors in the market an average of the prices over a period, usually a month, around the date of the take-over bid was used as a more reliable guide to share value in an economic sense than the price at any particular time.

5. Ignoring a possible difference in the value of earnings paid as dividends and earnings reinvested.

knowledge about individual companies and the economy in general, their estimate of future earnings is the best available; and the market price is the result of their estimates. The accuracy of any share value is thus directly proportional to the number, knowledge, and skill of investors operating in the market. Unfortunately, the Australian share market, even for the shares of the largest companies, is small and infrequent. Most brokers agree that Australian investors seldom switch between companies; most shares are held as long-term investments. Since there are often only a few shares on the market, the price is partly determined by the chance distribution of supply and demand.

In addition, the Australian investor is poorly informed. The general atmosphere of secrecy surrounding company actions and the poor standard of most public reports[6] must mean that the investor without inside connections does not have adequate information.[7] Since large numbers of shares change hands in a merger transaction, a small change in the price of an individual share can make a large difference in the valuation of a merger.

Interyear comparisons of values are affected by inflation, business activity, and interest rates. A high level of business activity tends to push share prices up, but it often causes an increase in interest rates which tends to push share prices down. However, inflation is a more important factor in interyear comparisons. The same amount of assets acquired would be represented by many more pounds in 1955 than in 1948. Thus the valuations are only rough estimates because of difficulties in finding the amounts paid and the weaknesses of market value as a guide to the true economic value of shares.

Types of payment for mergers.—Part 1 of Table II shows the types of compensation in merger transactions. The nature of the payment is determined largely by the policy of the acquiring company, its liquidity, and the nature of the ownership of the acquired company.[8] Although over the period as a whole the payment was in cash in nearly as many mergers as it was in shares,[9] at various times during the period the situation was quite different. The fall in share prices between 1951 and 1953, by discouraging share transactions, increased the proportion of cash payments in the smaller total. The nature of the merger and the organization of the industry dictate the type of payment in some cases.[10] Industries favouring shares were more active for internal reasons in mergers during 1949-51 while those favouring cash were

6. Only a minority of large companies reveal sales; many non-Victorian companies do not publish consolidated accounts. For an objective analysis see A. A. Fitzgerald, "How Good Is Australian Accounting?" *Australian Accountancy Progress 1956,* Butterworths, Sydney, 1956, pp. 23-40.

7. See R. F. Henderson, "The Australian Capital Market, 1946-53", *Economic Record,* Nov. 1954, pp. 174-5.

8. When the merger is small in relation to the acquiring company, it will usually give cash; for high value domestic mergers shares must be issued either to the vendors or to others.

9. When amalgamations, nearly always for shares, are subtracted, the total value of share considerations is only slightly greater than that of cash payments.

10. See Table III.

more active during 1953-4. Companies are more apt to use cash if they are in a liquid position—as in 1954, with business conditions improving but dividends not yet raised, expansion plans in their initial stages, and an improved inventory to sales ratio.[11] Many owners of firms taken over desired cash in 1954 because they wanted to spread their risks and increase their liquidity or because they heavily discounted the existing share prices after the 1951-3 slump.

2. *Reasons for Mergers*

Since most mergers are take-overs, the factors influencing the buyer are usually different from those affecting the seller. The eight reasons to be discussed here can roughly be divided into three which primarily affect sellers, four which primarily affect buyers, and one which affects both buyers and sellers. However, factors which initially influence one group may have a complementary effect on the other.

1. *Taxation.*—Our investigation indicates that the tax structure was the most important factor affecting sellers and probably the most important single cause of mergers. The high level of personal income taxes and the fact that capital gains are tax-free give men or families whose main asset is shares in one successful company the opportunity of selling their shares, in effect capitalizing future profits, and diversifying their investments without paying any tax. If they continue to hold their shares, they risk a set-back in the earnings of their company and pay high taxes on dividends. Many owners decided that, if progressive income taxes were to take the lion's share of their profits, they preferred to avoid the risk of a loss by selling to another company. When successful growing companies reach the end of their rapid development, they often accumulate liquid assets. If, instead of paying a bigger dividend, the company merges with a firm which needs the liquid resources, the shareholders can take the benefit of the company's liquidity in the form of untaxed capital gains instead of taxable dividends.

The tax laws throughout the period levied an undistributed profits tax in addition to normal company tax on the retained earnings of companies which were closely held. In order to escape this tax many large private companies spread their ownership by selling shares to the public and obtaining Stock Exchange listing. Small firms usually cannot spread their ownership in this way. Even large firms which are not known to the public may have to sell shares below their value to gain ownership spread. A merger with a public company thus is often the most economical way of escaping the undistributed profits tax.

Since past losses can be deducted from income before computing the tax, an accumulated loss becomes an asset to the company suffering the loss.[12] However, the asset value of an accumulated loss can only be

11. See A. R. Hall, *Australian Company Finance, Sources and Uses of Funds of Public Companies, 1946-55,* Australian National University, Canberra, 1956, p. 52, and Tables 41-2.

12. The loss is worth a maximum of x per cent of the loss where x is the highest marginal rate of company tax.

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TABLE II

Distribution of Mergers by Year, Type of Firm, Type of Merger, and Type of Compensation

TABLE II

Distribution of Mergers by Year, Type of Firm, Type of Merger, and Type of Compensation

(Values in £000)

	1946-56	1947	1948	1949	1950	1951	1952	1953	1954	1955	(1956)
TYPE OF COMPENSATION											
All Shares	290	15	13	27	48	49	19	21	29	41	28
Mainly Shares	57	1	1	5	7	5	2	5	6	13	12
Evenly Shares and Cash	40	2	—	3	1	4	3	4	5	12	6
Mainly Cash	5	1	—	—	2	0	1	—	—	1	—
All Cash	269	12	20	24	18	26	17	30	48	54	20
Other	12	1	—	—	—	—	2	3	2	—	4
% for all or mainly shares	52	50	41	54	72	64	48	41	39	45	57
% for all or mainly cash	41	41	59	41	26	31	41	48	53	45	29
Numbers of mergers £100,000 or over	233	10	10	19	19	25	17	23	27	48	35
% for all or mainly shares	63	80	40	79	84	72	59	52	52	56	66
% for all or mainly cash	27	10	60	16	16	24	24	35	44	27	17
NUMBER AND VALUE											
ALL MERGERS:											
Number	673	32	34	59	76	84	44	63	90	121	70
Value	142,326	5,510	5,319	7,056	8,536	32,339	5,661	10,929	13,585	36,218	17,421
Take-overs (complete)											
Number	558	22	31	38	69	70	38	56	74	99	61
Value taken over	81,495	4,730	5,081	1,548	7,636	9,252	4,801	4,691	7,401	23,044	13,300
Public listed companies											
Number	72	2	4	3	4	9	2	7	7	20	14
Value	33,629	2,737	2,772	524	3,158	4,855	1,746	1,302	1,445	11,852	3,238
Public unlisted companies											
Number	58	5	3	2	3	7	1	6	5	10	16
Value	18,776	857	664	139	1,016	1,225	100	1,079	533	5,466	7,697
Proprietary Companies											
Number	343	14	23	29	45	45	27	32	45	58	25
Value	26,635	1,129	1,566	834	3,125	2,647	2,776	2,148	4,791	5,430	2,189
Unincorporated firms											
Number	85	1	1	4	17	9	8	11	17	11	6
Value	2,445	7	80	51	336	524	180	163	632	296	176
Amalgamations:											
Number of firms involved	50	8	—	15	4	8	2	2	5	4	2
Value of firms involved	31,522	489	—	4,260	575	20,445	300	368	2,733	746	1,606
Assets only taken over:											
Number	19	1	1	3	—	1	3	1	1	7	1
Value	1,325	36	38	179	—	62	160	106	40	681	22
Take-overs—full ownership not acquired:											
Number	46	1	2	3	3	5	1	4	10	11	6
Cost of take-overs	19,416	210	103	611	164	1,716	200	2,697	1,985	9,826	1,905
Value of companies	27,994	255	200	1,069	325	2,580	400	5,514	3,411	11,747	2,493

realized by making profits in following years or by merging with a public company. Therefore companies with accumulated losses and poor prospects of making profits are usually eager to realize their losses by merging. In the past 10 years of prosperous business conditions few companies have consistently suffered losses; thus the carry forward of losses for tax purposes has not caused many mergers.

Estate taxes and death duties are especially important causes of mergers because the market for most shares is limited. Many Australian companies have been built up, owned, and controlled by one man or by a group of men who are contemporaries. When these men die and their shares are passed to their heirs, estate and inheritance taxes must be paid in cash. If the main asset of the estate is shares in closely held companies, some of these shares must be sold. The sale of shares in closely held companies usually suffers from discounting on the market; in addition the sale may be forced at an inopportune time, making the discount larger. A greater return may thus result from selling the shares to another company than from selling them to individual investors.[13]

2. *Shortage of qualified managers.*—The job of top management has become very complicated, not only because of increased technological complexity, greater government regulation, more important and intricate company taxes, and difficulties in finding supplies of most inputs, but also because of great improvements in the techniques of management and administration. One man can no longer keep himself informed on all the various subjects necessary to run a firm of any size; management is now the job of a team. In the present complicated business world there are diseconomies of organizations which are too small to provide a team of expert managers.

The mergers caused by the shortage of management personnel can be divided into three groups. First, firms too small to afford a well-rounded team but too large to be run efficiently by one or two men were taken over by companies which had an adequate executive team. Second, many firms which had always been family owned and managed were sold to other companies when the family found it could not longer provide the managers itself or when it could not hire any suitable executives. Third, in some cases the existing management thought it was doing a good job, but the management of the acquiring company thought it could do much better with the assets and offered what seemed a high price on the basis of the company's past performance.

3. *The difficulty of obtaining new funds.*—During virtually the entire period credit has been tight in Australia. Not only have boom times and rapid development opened possibilities for profitable investment in most industries but inflation has made new money absolutely essential even to do business at previous levels. In many industries the money necessary to carry the same real value of stocks more than

13. If the firm is small, it usually must be sold to another firm as the only available buyer.

doubled; the replacement cost of equipment purchased before the start of the period has usually been over twice the original book value. Thus the tax-free funds from income-covered depreciation have met only part of the replacement cost. Most firms have desperately needed new funds at some time during the past ten years.

New funds are rationed by access to the capital market and past standing in it. Borrowing from financial institutions, especially insurance companies, is almost as important as raising new funds through the Stock Exchanges. Established public companies are able to borrow or raise large amounts on the security of their fixed assets and good record; but small firms, especially those closely held, have difficulty in bidding against larger, better-known firms for the limited supply of funds. Private companies are also at some disadvantage in financing through retained earnings because of the undistributed profits tax. The difficulties in raising new funds are greater the smaller the firm, the larger the proportion of new funds to the existing assets, the more closely held the capital, and the further removed the legal organization from the status of a public listed company. The group hit hardest, proprietary companies worth under £100,000, contains 43 per cent of the mergers studied.

One way to gain access to new funds is to become listed, but closely held firms must first spread their ownership. Since closely held companies are not known and since the previous owners usually keep operating control, general investors are reluctant to purchase the shares, especially when there is an alternative of shares in a proven company. Because these factors cause a discounting of the shares on the market,[14] the firm is often able to negotiate more favourable terms with another company which may pay for advantages in extending its competitive power as well as for the physical assets.

The difficulties in obtaining funds for expansion, the effects of taxation, especially death duties and personal income tax, and the problems of providing a trained management team have been the main factors influencing sellers in merger transactions. Although these factors affect almost all companies, they make the very existence of closely held proprietary companies difficult; the trend away from proprietary organization to Stock Exchange listing has been both widespread and continuous. Some firms changed status by converting and selling shares to the public, others by merging with a public company.

4. *Advantages of large-scale operation.*—From the buyer's point of view a merger is not a good way to achieve economies of scale in the processes of production. Although the acquiring company expands its market through the merger, it also increases its fixed assets. Economies of scale in production are made primarily by expanding the market for the output of one productive layout. More important in causing mer-

14. The shares of 33 existing companies which made their first public issue on the buoyant market of 1950 had increased in value by an average of 24 per cent on July 1, 1954, while the overall market had declined by 7 per cent. Although this indication of a 30 per cent discount is too high, the discount is substantial.

gers than economies in production processes are economies in management, administration, purchasing, selling, and distribution. The big firm can spread the costs of its management experts over a large output; the larger the firm the better its access to new money, the greater the possibilities of economies in bulk purchasing. Only the large firm can afford to advertise continually through the mass media; by keeping its name before the public it benefits all its products.

Economies of scale influence sellers as much as buyers. A firm which cannot expand or does not wish to, may find that its competitors, by increasing their scale of operations, have reduced their unit costs below the costs of the stagnant firm. Again the reduced costs are more often overheads than actual production costs. Even when large competitors cannot achieve lower costs, the small firm often feels insecure, knowing that the greater financial resources and possible product diversity of the larger firms give them advantages.

5. *Interstate expansion.*—Many mergers between 1946 and 1956 have been part of an expansion of firms which operated in only one or two States before the war into Australia-wide operations. Improvements in transportation and communication, advances in technology making production more complicated and capital-using, the introduction of more mass production and many new products have created both the opportunity and the need for an Australia-wide market in fields where it did not previously exist. Rather than try to enter a new market in another State in opposition to existing firms, some companies merged with interstate firms to form one organization with access to the previous market of both.

Technological advances have made Australia-wide operations necessary in some fields. Many productive operations which were previously economical on a small scale because only simple machines were used have been revolutionized by the development of automatic machines. The capacity of even the smallest automatic machinery is sometimes greater than that of any firm operating in the industry with old equipment. In most cases it is not necessary to capture the whole Australian market in order to sell the output of the most up-to-date machines. Instead the choice is often the whole market of one State or 20 per cent to 40 per cent of the Australian market. It is usually easier to capture some sales in many markets than all the sales in one market. Thus some firms which wanted to use the most advanced technology have spread their market by means of an interstate merger in order to justify the capital expenditure.

Although transport is better than pre-war, it is expensive for heavy or bulky products, and there have frequently been delays. When an interstate market cannot be completely exploited because of transport costs or delays, a merger may be arranged in order to supply the interstate market from a local factory.[15]

15. A conservative estimate of the proportion of mergers involving an interstate expansion in some product would be 10 per cent.

6. *Diversification and empire building.*—Most lateral mergers[16] involve firms in the same industry. Companies with aggressive managements and access to funds often spread into closely related fields which are growing rapidly, in which they think they will have a competitive advantage, or where firms are being sold at reasonable prices for the reasons already discussed. The main reasons for this type of merger are economies in distribution and advertising, the use of related productive technology and in many cases the same raw materials and components, improved buying position, and the opportunity to employ liquid resources. Instead of raising dividends which are taxed, some firms in stagnant but profitable industries have used retained earnings to spread their operations into other industries. A merger is sometimes the initial step in such inter-industry movements.

There is little doubt that an important cause of mergers is the desire of some directors and managers to increase their own power and prestige by increasing the size of the companies they control. Although empire building is seldom the only reason for a merger, it may be the deciding factor. Since these take-overs cannot be distinguished from other mergers, it is impossible to judge the quantitative effect of empire building.

7. *Vertical integration.*—During the booming post-war period firms have been eager to take over suppliers of scarce materials to guarantee themselves first choice of the limited supply. Of 38 mergers for which sufficient information was available to make a clear classification as a vertical integration, 33 were acquisitions of a raw material or component supplier. Purchases of distributors are usually made when the acquiring firm finds its sales lagging; these were not prevalent during the prosperous post-war period. In cases of both forward and backward integration the acquiring company is the logical buyer for a supplier or distributor which may come on the market. The firms are already associated by frequent business dealings, and their operations are complementary.

Another type of merger which is not a vertical integration, though similar, is the purchase of a firm to acquire land or other fixed assets. About 5 per cent of the take-overs studied were made merely to obtain a desirable site or building which could be adapted for expansion of the acquiring company's operations after the acquired business was disbanded. In many other cases it was cheaper to buy an existing firm and adapt and expand its operations than to build an entirely new establishment, even aside from the advantages of acquiring its market and staff. Not only was the cost of building high, construction slow, a desirable location difficult to find, and the profitability of expansion great, but also many companies with valuable buildings and sites came on the market at reasonable prices due to the tax structure and the difficulties they encountered in attracting managers and capital. If the take-over could be made for shares, liquid resources were also conserved.

16. Those between firms engaged in the production of different finished products.

8. *Reducing Competition.*—The advantages of horizontal mergers may be great; besides reaping monopoly profits, the new firm may save on advertising, distribution, and administration expenditures; the firm may not be forced to spend much on research and development of new products; there may be technological economies of scale. However, before most of these advantages accrue, almost all competition in the field must be eliminated. A merger between two competing companies in a field where there are many firms does not yield many monopoly benefits. In some cases the merger of two relatively small firms in an industry dominated by a few giant operators increases competition, at least in the short-run. Reduction of competition is an important factor causing mergers in a few industries, but in the vast majority of mergers it is not the main factor influencing buyers.

Although only a few mergers are caused by a desire to limit competition in a particular field, the buyer in almost all mergers is influenced by the fact that the transaction will strengthen his competitive position by adding to his resources. Diversification puts a firm in a better position to compete in any section of its operations. Vertical integration backward may cut off the supply of a vital component to a competitor. Interstate expansions are often made to beat a competitor into the market. Only a few mergers during the post-war period were arranged specifically to limit competition; but most buyers considered the increased competitive strength they would derive from the merger as at least a minor factor favouring the transaction.

The reasons for most mergers are very complicated. Several factors affect each merger in varying degrees of importance, and the causes influencing the sellers are usually different from those affecting the buyers. It is impossible to decide which reasons have been most important in the past ten years. However, two important conclusions can be drawn from this study: First, during the post-war period incentives for owners of closely held firms to sell their shares to widely held companies have been very strong, and sellers have initiated many of the mergers in this period. Second, decreasing immediate competition is only one of many reasons for buying other firms.

3. *Growth and Acceleration of the Merger Movement*

Table II shows two interesting features of the post-war merger movement: a tendency for the number and value of mergers to increase rapidly from year to year and a large decline in merger activity during the 1952 recession.

Mergers in recessions.—The large drop in merger activity in 1952 coincided with the fall in share prices, the decline in world wool prices, the "horror" budget of 1951, and the fall in general business activity. Probably these factors influenced the merger movement most through their effect on businessmen's expectations. When businessmen expect a contracting or even steady market for their products, they are not eager to undertake any expansion, including mergers. All five of the

factors affecting buyers discussed above are less forceful when businessmen are pessimistic; they are not interested in buying automatic equipment to gain economies of scale, they realize that entry into a contracting market in another State is especially difficult, liquid funds and the energies of management cannot be spared for diversification, empire builders concentrate on maintaining their dividends and sales positions, suppliers no longer need be acquired. In a depressed industry a company tries to take sales away from its competitors in order to use its idle capacity.

Owners of closely held firms who want to merge in order to avoid private company taxes, to reduce personal income taxes, or to provide more liquid assets in case of death have the advantage of choosing a time for their negotiations when they can get the best offer. With businessmen generally pessimistic, 1952 was not the best time to negotiate mergers. The recession undoubtedly destroyed many firms' desires for new funds for expansion.

Another factor causing the decrease in merger activity in 1952 was the rapid fall in share prices. When the market value of a company's shares is reduced, it must give a greater number of shares to purchase a given value of assets. The effects of the drop in share prices are partly offset because the same factors that cause it cause also a somewhat comparable reduction in the value of the firm to be acquired. Nevertheless, since it is the aim of any company to maintain its dividend even when the market value of its shares falls, any increase in the number of shares necessary to purchase a given earning power makes the acquisition more expensive. Since most companies simply do not merge instead of switching from a share to a cash payment, the fall in share prices was a powerful factor reducing the number of mergers in 1952. In short, merger activity declines during a recession or the initial stages of a depression when the influence of rapid expansion and development is removed, but few companies are yet in grave difficulties and threatened with the choice of merger or liquidation.

Acceleration of merger activity.—The increase in the number and value of mergers has been both steady and rapid except for the recession years centred on 1952. The growth in numbers is overstated because the coverage is more complete in recent years; the increase in value is overstated because of inflation. Nevertheless, it is certain that 1955 saw more mergers both in terms of numbers and value than any previous year in Australian history. Although the figures for 1956 are not complete, it appears that there was a slightly greater number of mergers in 1956 than in 1955 although total value was less.

Almost all the reasons for mergers discussed above have accelerated the movement. The hopes of many owners of closely held companies that the undistributed profits tax would eventually be repealed have gradually dissolved. Businessmen have come to realize the implications of both the personal income tax and the private company tax as well as of ways to escape them. Examples of forced selling of closely

held shares to raise cash for death duties and to settle estates have made people aware of the problem, leading to a switch from forced selling after the death of the owner to selling at an opportune time before his death. In the first years of tight credit many firms can reasonably expect their financial difficulties to be solved in a short time by an easing of the credit situation. However, the longer tight credit continues, the greater the number of firms finding they can wait no longer for money to become available. The post-war shortage of managerial personnel has been aggravated by the fact that few people received executive training during the depression or the war. There is a lag of a few years before the effects of old-fashioned management show in a firm's returns, especially during prosperous times.

Rapid advances in productive technology and the more ready availability of complicated equipment from overseas after 1949 have increased the opportunities for interstate expansion and economies of scale. The longer a company has difficulty in obtaining a particular component or raw material the more eager it is to guarantee the supply by taking-over the supplier. During the war many of the causes of merger in the present period got their start; company taxes were increased, the managerial revolution started, the technology of mass production advanced faster than ever before, the Australian States were drawn together as one economy. Wartime conditions and controls did not actually delay many mergers, but during those years many factors which have since been major reasons for mergers had a long period of development. Their effects were felt after the economy adjusted to prosperous peacetime conditions.

In addition to the factors which have been identified as causing particular mergers there are four general effects which have accelerated merger activity. The first may be called the competition effect. When a firm finds that its competitors are increasing their size and importance through mergers, it often feels that it must also increase its size to maintain its competitive position. The second factor is the acceptance of mergers by businessmen and the investing public. It now seems to be common for a weak company to seek a merger as a way out of its difficulties, or for a company which needs additional capacity to look for a likely firm to take over. Businessmen are willing to give shares to acquire other firms; and, more important, shareholders of the acquiring companies are willing to have their directors give shares ranking *pari passu* with their shares.

Third, the psychological effect of having a government friendly to business in power may have made businessmen more optimistic about their future and more eager to make merger acquisitions. The fourth factor adding to the continual growth of the merger movement has been the high level of prosperity with steady increases in business activity. Mergers made by empire builders or others have been successful in most instances. Probably nothing encourages a company to make a second take-over as much as success in its first.

Future merger activity.—Since a large part of Australian business is still conducted by closely held independent firms,[17] the influence of the tax structure, management problems, and the difficulties in raising capital will continue to be strong. On the other hand more stable economic conditions will reduce the number of mergers made to acquire a supplier or facility for expansion. But liquidity from profitable operations may enable succesful firms to diversify, extend their product lines, and expand interstate. In addition the prevalence, acceptance, and success of past mergers will lead some aggressive managements to continue making acquisitions. Thus prosperous business conditions in the next five years will almost certainly be accompanied by substantial merger activity. A recession will reduce merger activity following the 1952 pattern. Since most of the factors causing mergers have now been accepted as part of the business environment, there will be little tendency for merger activity to be accelerated. The number of mergers will probably stabilize for a few years at about the 1955-56 level of just over 100 mergers per year.

The total value of mergers is much harder to predict as it depends on the few big mergers. Unfortunately, the danger of high value mergers leading to the dominance of the resultant monster company in the industry has been increased by the prevalence of small mergers. Mergers have been accepted as a normal part of business behaviour. Several industries such as city emporiums and chains, pastoral suppliers and agents, and electrical equipment manufacturers have become much more concentrated through a series of relatively small mergers. More competitive business conditions could lead to mergers among the giant firms in many industries.

4. *Mergers and the Growth of Large Firms*

How important were mergers in the growth of Australia's largest companies during the 1946-56 period? Are mergers a characteristic of especially rapid growth? To answer these questions an attempt was made to measure the growth of the largest non-mining companies whose ordinary shares are available to the general public. Growth was determined, not by adding up acquisitions of resources, but by measuring size at the beginning of the period, June 1947,[18] and at the end, June 1956, and comparing the two figures. Since mergers affect monopoly position, the allocation of resources, and efficiency, these factors should be included in the measure as well as the amount of resources used in either an historical or current value sense. In a free market economy

17. Despite the great difficulties experienced by unlisted companies in raising new money, in 1954-5, 29 per cent of total new money raised by all companies went to unlisted companies. (Commonwealth Bureau of Census and Statistics, "New Capital Raisings by Companies in Australia", Canberra, March 1957.) In addition to companies there is a multitude of unincorporated businesses, especially in the tertiary industries. It seems that on a value added basis 45 per cent to 55 per cent of non-governmental, non-farm business is conducted by unlisted enterprises.

18. This date was chosen as there was price control on ordinary shares until January 1947.

a firm's profits reflect all these factors at once—the current value of resources employed, monopoly position, efficiency of the firm, and the degree of resource scarcity in the industry. The market value of ordinary shares is the best available estimate of future profits.[19] Thus it is used as the basis for the primary measure, market value of ordinary shares plus par value of preferences and face value of long-term debt. Since market value is often distorted by speculators or based on very limited knowledge of a firm's competitive position or internal efficiency, it may be misleading in some cases.

Because many objections can be raised to market valuation of shares, a second series based only on balance sheet figures was also used—shareholders' funds plus long-term debt. This measure concentrates on the cost of resources used and makes little allowance for monopoly position or allocation of resources. It also suffers from the irregular revaluation of fixed assets. Certainly neither of these measures is very accurate, but they do give some indication of company growth.[20] Coefficients of expansion based on the number of times the value of firms increased between 1947 and 1956 were calculated where possible for the top 100 companies in absolute value according to either measure in either year. Information was not available on 47 companies at one date or the other because they were not listed or because they were taken over during the period. There were 103 firms for which full information was obtainable.

The total increase in market value of ordinaries plus par of preferences and long-term debt was £346 millions (shareholders' funds plus long-term debt £443 millions); of this £61 millions or 17½ per cent (14 per cent) represented the value of merger acquisitions by these 103 firms. Thus compared with retained earnings and new issues, merger acquisition was not a major method of expanding firm size. Only 40 of the top 103 engaged in any merger activity at all; 27 per cent of the expansion of these companies was through mergers. The first conclusion is that mergers directly represented only a small part of total growth of the largest Australian firms between 1947 and 1956. Retained earnings, new issues, and changes in demand, efficiency, or monopoly position were more important than mergers in determining the development of companies.

The 103 largest public companies for which coefficients of expansion based on market value could be calculated were placed in 7 groups of 15 each[21] according to their coefficients in descending order. Of the 15 fastest growing firms 13 engaged in some merger activity making a total of 56 mergers; in the second group of 15, 7 made 25 acquisitions; in the third group 5 made 22 acquisitions; in the fourth 5 made 10 acquisitions; in the fifth 5 made 13; sixth 4 made 5[22]; seventh 1 made 1 acquisition. Mergers are most frequent among the fastest growing

19. Other measures such as current profits or sales refer only to the present or past, not the future, operations.
20. The correlation between the measures for the purposes of this study is high.
21. In the seventh group there were only 13 companies.
22. Excluding 11 small take-overs by Goldsbrough Mort.

firms.[23] The second conclusion is thus that mergers are a typical, though not necessary, characteristic of especially rapid growth.

However, even for the fastest growing firms, expansion through mergers was not nearly as important as growth in other ways. Only 24 per cent of the growth of the 15 fastest growing firms[24] was through merger acquisitions. Moreover, for very rapidly expanding companies which engaged in merger activity, the proportion of growth through mergers, 26 per cent, was no greater than that for other firms which engaged in merger activity, 28 per cent. Thus the third conclusion is that, although mergers are usually a characteristic of very rapid expansion, they are not in general the cause of especially rapid growth. In other words the aggressive and capable management team, access to the capital market, and expansion outlook of some firms lead to rapid growth; part of this fast growth is usually through merger transactions because the same underlying factors place the firm on the lookout for all ways, including mergers, of improving its market position, bettering its efficiency, and increasing its profits.

5. *Mergers and Competition—Mergers and Development*

To discuss the effects of mergers on competition, the competitive situation in individual industries must be examined. In Table III the business sector has been divided broadly into 10 major groups which have been subdivided to illustrate particular points. The industry subgroups fall into four categories according to the changes mergers caused in their competitive structure during the period studied. Mergers have led to the development of an oligopolistic set-up with strong potential for monopoly advantages and profits in three fields—container manufacturing, Melbourne milk distribution, and newspaper publication. Mergers in several other fields which were oligopolistic and only slightly competitive at the beginning of the period have decreased that competition even further, especially in paper, rubber, chemicals, and banking. Mergers were most prominent in fields which were characterized by many relatively small firms at the beginning of the period, but in which several large integrated companies had taken the dominating positions, partly through mergers, by 1956. These fields—the timber industry, tanning and leather manufacturers, electrical manufacturers, pastoral suppliers and agents, and city emporiums and chains—are still competitive, and mergers have probably improved their efficiency. However, the danger of mergers among these integrated firms is now great; such mergers could drastically reduce competition. In other fields mergers had little effect on the organizational or competitive structure. Thus only a small minority of the mergers tended to lessen competition substantially.

In the United States the anti-trust laws forbid mergers, "where in any line of commerce in any section of the country the effect of such acquisition may be substantially to lessen competition, or to tend to

23. The same pattern is found for total value of mergers.
24. With coefficients of expansion of 21·38 down to 4·57.

TABLE III

Industry Distribution of Mergers

	Number of Acquiring Coys.	Number of Listed Coys. Syd. and Melb. June 1956	Number of Mergers	Value of Mergers	Number of Mergers under £30,000	Mergers over £499,999	Mergers 99,999 to 500,000	Year Distribution					Type of Payment		
								1947 /49	1950 /51	1952	1953 /54	1955 /56	All or Mainly Shares	All or Mainly Cash	Other or Even
I. Financial Institutions	17	103	30	27,074	6	7	8	5	8	1	8	8	18	11	1
1. Hire Purchase & Finance	9	41	20	3,660	5	3	4	3	4	1	7	5	14	5	1
2. Banks	2	7	4	22,197	0	3	1	1	2	0	0	1	3	1	0
3. Other	6	55	6	1,217	1	1	3	1	2	0	1	2	1	5	0
II. Processors of Primary Products	36	125	86	9,709	30	2	27	23	21	6	17	17	48	32	6
1. Timber Industry	13	24	33	2,128	14	0	7	11	7	5	6	4	11	17	5
2. Food Processors	15	79	30	2,982	10	0	10	4	3	1	11	11	19	10	1
3. Tanning and Leather	4	8	18	2,847	5	1	9	5	10	0	1	2	16	2	0
4. Minerals	4	10	5	1,752	1	1	1	3	1	0	1	0	2	3	0
III. General Secondary Mfg.	77	253	168	27,681	37	13	53	37	25	10	40	56	91	62	15
1. Light Industry	19	80	33	3,538	13	3	3	9	6	4	5	9	17	15	1
2. Electrical	10	31	33	4,217	9	2	13	8	4	3	9	9	17	13	3
3. Containers Mfg.	6	9	15	4,315	0	3	8	4	2	0	4	5	11	1	7
4. Fabricating Capital Equipment	20	81	38	4,842	6	2	4	6	6	1	14	11	16	15	0
5. Paper, Plastics, Chemicals, Rubber	10	29	24	6,855	6	3	12	2	4	2	3	13	20	4	1
6. Heavy Industry	12	23	25	3,914	3	0	13	8	3	0	5	9	10	14	4
IV. Automotive	21	70	46	8,088	11	4	16	6	14	1	7	11	27	15	1
1. Distribution	8	37	10	744	2	0	4	0	1	0	3	3	4	5	1
2. Manufacturing	4	10	11	4,268	3	4	1	1	5	1	1	3	6	5	0
3. Components manufacturing	9	23	25	3,076	6	0	11	5	8	1	3	5	18	4	3
V. Textiles	24	88	48	6,806	14	3	14	9	7	4	14	16	25	14	9
1. Basic Production	9	19	16	3,582	4	2	5	5	0	2	4	6	9	6	1
2. Finished Products	15	69	32	3,224	10	1	9	4	7	2	10	10	15	9	8
VI. Construction	15	81	24	2,510	4	0	8	2	9	1	5	8	15	8	1
1. Builders Suppliers Mfg. dist.	8	53	14	1,352	3	0	3	0	6	0	3	5	9	5	1
2. Cement, bricks, blue metal	7	28	10	1,158	1	0	5	2	3	0	2	3	6	3	1
VII. Transport	13	34	31	2,102	9	0	3	7	9	1	5	9	10	20	1
1. General	5	15	9	726	0	0	2	3	2	1	0	3	5	4	0
2. Road	8	19	22	1,376	9	0	1	4	7	0	5	6	5	16	1
VIII. General Services	20	137	42	10,170	9	6	11	8	6	1	8	17	13	22	7
1. Publishing and Printing	9	23	14	6,317	2	4	1	5	1	0	5	3	4	10	0
2. Other	11	114	28	3,853	7	2	10	3	5	1	3	16	9	12	7
IX. Retail and Wholesale Dist.	35	141	165	43,095	69	19	27	20	57	12	40	36	95	63	7
1. City Emporiums and Chains	10	13	55	33,508	7	16	14	3	19	3	12	18	28	24	3
2. Other Dry Goods	7	62	11	843	3	0	2	1	4	1	2	3	5	5	1
3. Food Chains	4	11	49	2,832	30	1	8	15	25	3	4	2	7	5	0
4. Milk Distributors	8	12	34	1,144	25	0	2	0	2	0	2	0	5	5	0
5. Other	6	43	16	4,768	4	1	1	1	7	0	4	0	9	4	0
X. Pastoral	10	18	33	5,093	12	2	1	8	4	2	7	1	2	7	2

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create a monopoly''[25]. An analysis was made to determine which Australian mergers would have been illegal if Australia had had anti-trust laws similar to the American laws and the courts had interpreted them in the same way. Only 12 mergers would definitely have been illegal, another 10 might have been. In addition there were a few restrictive mergers such as those in the Melbourne milk distribution industry which would not have been covered by the law because the firms did not deal in interstate commerce. This low proportion, 3 per cent, of mergers which would have been illegal under American law is another indication that the vast majority of Australian mergers did not substantially reduce direct competition.

Many fields, especially basic industries such as iron and steel, other metals, chemicals, and glass, but also banking and brewing, were concentrated in the hands of a few firms at the beginning of the period. Thus there was little scope for mergers to take place in these fields where high entry cost and complex technology aid the establishment of monopolies. In addition, there is no legislation effectively operating in Australia to prevent price fixing, division of markets, and many other practices restricting competition. Hence firms do not need to merge to derive monopoly benefits; they need only agree among themselves to limit competition, not a difficult job for a small number of firms in prosperous times when the main market divisions concern the amount and types of expansion. There are undoubtedly political advantages in maintaining an illusion of competition when effective competition does not exist. Changes in consumer demands, government actions, entry of new firms, and trade agreements all seem to have been at least as important as mergers in changing the competition pattern.

Mergers have in general made a useful contribution to Australia's rapid development of a modern industrial economy using advanced techniques of production, distribution, and management. In 1946 a substantial part of Australian business was characterized by one-man management, family ownership, small-scale operation with manual-directed machines, antiquated distribution methods, and an ''it-will-do-me'' attitude toward improvements in organization and production technology. In the past 11 years many modern firms have emerged, characterized by team management, widespread ownership and access to new funds, large-scale operations using automatic machinery, up-to-date distribution organizations, and an attitude of continual improvement in managerial and production methods. In some cases mergers have helped to bring together enough resources in one firm to make this transition possible. On the other hand mergers have provided a graceful exit for owners and managements who found the transition difficult or impossible. Mergers have played an important part in the movement from overgrown backyard operations to scientifically planned factories and stores.

J. BUSHNELL

University of Melbourne.

25. Celler-Kefauver Act (revising the Clayton Act) 81st Cong. 2nd Sess.

A MODEL OF THE TRADE CYCLE*

I

The purpose of this article is to present a model of the trade cycle which emphasizes the interaction of real and monetary forces. The following pages consist of a synthesis of existing ideas, based mainly on the work of J. R. Hicks, N. Kaldor, F. Modigliani and P. A. Samuelson.[1] The main justification for this synthesis is that the suggested technique of analysis, with its explicit introduction of monetary forces, provides a useful expository device.

The recent literature in trade cycle theory has usually ignored the rôle of money. Undoubtedly, the view that the rate of interest is of minor importance in the determination of investment decisions has been mainly responsible for this omission. However, concessions have been made to the rôle of monetary forces in producing a cycle, without the accompanying formal integration of these forces into the basic theory. For example, in Hicks'[2] model of the cycle, the monetary factor is introduced as a *deus ex machina*, made necessary by the deficiencies of the real cycle. By crudely superimposing the monetary cycle on to his real cycle, Hicks ensures that the lags, which are so important in producing his "monetary cobweb", play no part at all in the combined operation of the real and monetary cycles. Nor can Kaldor's treatment of the rôle of the rate of interest be regarded as satisfactory in this respect. He assumes that the influence of the rate of interest is incorporated in his $S(x)$ and $I(x)$ functions.[3] This implies that at any level of economic activity (x), the rate of interest and its influence on the two functions are specified. But all that Kaldor specifies is that at high levels of activity, a high rate of interest lowers the value of dI/dx.

The procedure followed in this article is to show that, by a slight modification of Hicks' account of the Keynesian system, we obtain a model which is a diagrammatic account of the dynamical models presented by Samuelson[4] and Modigliani[5]. It can be argued that this diagrammatic exposition makes the stability conditions of the model more intelligible to the non-mathematician. In addition, by introducing long-period shifts in the investment schedule (following Kaldor[6]), a cycle results.

* The author would like to acknowledge the helpful comments on numerous versions of this article from Professor T. W. Swan and Mr. W. B. Reddaway. Dr. R. M. Goodwin and Mr. R. C. O. Matthews also made helpful criticisms. None of them however can be held responsible for the present form and content of the article.

1. J. R. Hicks, "Mr. Keynes and the 'Classics'; A Suggested Interpretation", *Econometrica*, Vol. V, 1937; N. Kaldor, "A Model of the Trade Cycle", *Economic Journal*, 1940; F. Modigliani, "Liquidity Preference and the Theory of Interest and Money", *Econometrica*, Vol. XII, 1944; P. A. Samuelson, *Foundations of Economic Analysis* (Harvard University Press, 1948), pp. 276-283.

2. J. R. Hicks, *A Contribution to the Theory of the Trade Cycle* (Oxford 1950), Chs. 11-12. 3. *Loc. cit.* p. 79. 4. *Op. cit.*, pp. 278-280.

5. *Loc. cit.* pp. 62-4. 6. *Loc. cit.*, pp. 83-5.

II

We begin by deriving the IS schedule. This schedule shows all combinations of values of money income and the rate of interest which ensure equilibrium in the goods market (defined by the equality of *ex ante* saving and *ex ante* investment). Assuming constant money wages and a perfectly elastic supply of output,[7] we may treat money income as perfectly correlated with output, and in the short-period, with employment. We assume that saving is an increasing function of both income (Y), and the rate of interest (r) : $S = S(Y, r)$. For consumption expenditure we write: $C = C(Y, r.)$. Investment is assumed to be a diminishing function of the rate of interest and the stock of capital (K), and an increasing function of the level of income: $I = I(K, Y, r)$. In figures 1A and B, the schedules are drawn as short-period schedules, i.e. we assume a given capital stock. At low levels of income (below Y_2 in Figs. 1A and B) we assume that $Iy < Sy$[8], because of the existence of a great deal of surplus capacity. Where more than "normal" reserve capacity exists, an increase in income "... will not induce entrepreneurs to undertake additional construction: the rise in profits will not stimulate investment."[9] In Fig. 1A, $Iy < Sy$ is shown by the shifts in the investment schedule, from I_0 to I_1 to I_2, being smaller than the corresponding shifts in the saving schedule. Alternatively, at higher levels of income (above Y_2), a rise in income implies that the "normal" reserve capacity of firms must be utilized, and the consequent rise in profits induces entrepreneurs to plan additional investment. We assume that this investment is large enough to make $Iy > Sy$. This is shown by the shifts in the investment schedule, from I_2 to I_3 to I_4, being greater than the corresponding shifts in the saving schedule. In Fig. 1A, as saving and investment are graphed against the rate of interest, a rise in income implies that the appropriate saving and investment schedules lie further to the right. The subscripts 0, 1, 2 ..... refer to the income levels, Y_0, Y_1, Y_2 .....

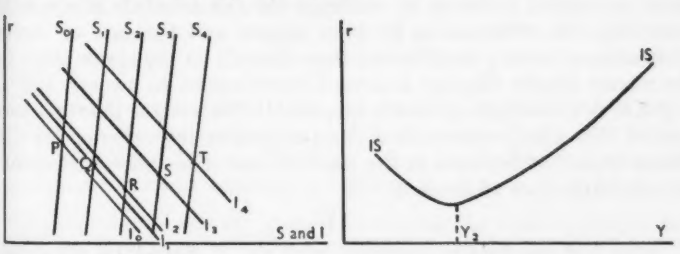

FIG. 1A FIG. 1B

7. Given that firms regard a certain percentage of excess capacity as normal, and plan additional investment when capacity is, or is expected to be, more fully utilized, this assumption becomes a reasonable first approximation for an economy experiencing some degree of unemployment.

8. Iy and Sy are written for the partial derivatives $\partial I/\partial Y$ and $\partial S/\partial Y$ respectively.

9. Kaldor, *loc. cit.*, p. 81.

P, Q, R, S and T are positions of equilibrium in the goods market, where *ex ante* saving equals *ex ante* investment. As income rises to Y_2 the rate of interest, which equates *ex ante* saving and *ex ante* investment, falls. In contrast, as income rises above Y_2, the rate of interest, which ensures equilibrium in the goods market, rises. Consequently, the Hicksian IS schedule (Fig. 1B) is U-shaped. Whether the IS schedule slopes upwards or downwards depends solely on the relationship of Iy and Sy.[10]. However, the steepness of the slope depends in part on the values of Sr and Ir.[11] Given the values of Iy and Sy, the slope of the IS schedule is steeper, the lower the values of Sr and Ir (neglecting the sign).

III

We assume that the money supply (M) is given, and that the demand for money (L) is an increasing function of income and a diminishing function of the rate of interest: $L = L(Y, r)$. With this information we can derive the LM schedule (Fig. 2A). This schedule shows all combinations of values of income and the rate of interest that ensure equilibrium in the money market (defined by the equality of the demand for and the supply of money: $M = L(Y, r)$). The schedule is identical with Hicks' LL schedule,[12] and will, in general, slope upwards. At low levels of income the schedule is horizontal, indicating the minimum rate of interest where the demand for idle balances is infinite. At the other extreme the schedule is vertical, indicating the maximum level of money income (and, on our assumptions, real income) that can be sustained with the given money supply. In Fig. 2A, assuming a given money supply, the appropriate LM schedule is LM.

If the money supply is responsive to changes in income (via the demand for active balances), then the LM schedule continually shifts to the right. In figure 2A, the appropriate increase in the money supply shifts the LM schedule to LM′. We would have to draw a series of these schedules, with each schedule implying a different money supply. It is more convenient, however, to construct the LM schedule as a schedule describing the relationship between income and the rate of interest (assuming monetary equilibrium throughout), on the assumption that the money supply displays a given responsiveness to income. LM″, in Fig. 2A, is an example of such a schedule.[13] The greater the responsiveness of M to changes in income (i.e. the greater the value of My), the flatter the schedule, until in the limiting case it becomes horizontal at the minimum rate of interest.

IV

The LM schedule is combined with the U-shaped IS schedule in Fig. 2B. This combination gives three possible positions of equilibrium

10. See IV below. The point can be demonstrated graphically, for if $Sy = Iy$, the IS schedule is horizontal no matter what values (other than both equally zero) are taken by the interest-sensitivities of saving and investment.

11. Sr and Ir are written for the partial derivatives, $\partial S/\partial r$ and $\partial I/\partial r$ respectively.

12. "Mr. Keynes and the Classics", *loc. cit.*, pp. 153-5.

13. Hicks, *Trade Cycle*, pp. 141-3.

of the system.[14] These are A, B and C with LM′ the appropriate schedule (assuming a given money supply), and A, B and C′ with LM″ the appropriate schedule (assuming a positive value of My). If we assume that monetary equilibrium, and the adjustment of investment to the rate of interest are achieved instantaneously, while only

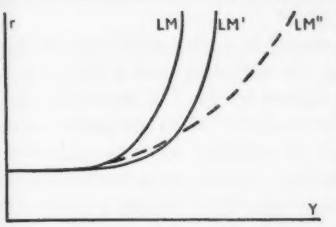

FIG. 2A

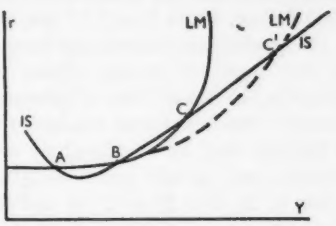

FIG. 2B

the goods market takes time to adjust via the multiplier process, then Fig. 2B can be regarded as a diagrammatic representation of Samuelson's and Modigliani's dynamical models of the Keynesian system.

On our assumptions, $Ir < 0$, $Sr > 0$, $Ly > 0$ and $Lr < 0$ (adopting the same convention as above for writing partial derivatives). In the case where the money supply is constant ($My = 0$), the stability of equilibrium requires that [15]

$$Ly\ (Ir + Cr) + Lr\ (1 - Cy - Iy) < 0 \quad \ldots\ldots\ldots\ldots \quad (1)$$

This can be rearranged as

$$\frac{1 - Cy - Iy}{Ir + Cr} < -\frac{Ly}{Lr} \quad \ldots\ldots\ldots\ldots \quad (2)$$

or[16]

$$\frac{Sy - Iy}{Ir - Sr} < -\frac{Ly}{Lr} \quad \ldots\ldots\ldots\ldots \quad (3)$$

If $My > 0$, the condition becomes[17]

$$\frac{Sy - Iy}{Ir - Sr} < \frac{My - Ly}{Lr} \quad \ldots\ldots\ldots\ldots \quad (4)$$

The left-hand side of (2), (3) and (4) is the slope of the IS schedule, while the right-hand side is the slope of the LM schedule. Given that $My < Ly$, the R.H.S. is > 0 or, in the limiting case where the demand for idle balances is infinite, is equal to 0. If Iy is $< Sy$,

14. It is possible that the positions of the schedules result in one position of equilibrium. It is shown below that this occurs at particular stages of the cycle.

15. Samuelson, *op. cit.*, p. 277, equation (61) and p. 279, equation (69). Samuelson's notation has been altered.

16. Modigliani, *loc. cit.*, p. 64.

17. Professor Swan informs me that (1) above implies that Lr is negative, for otherwise the inequality sign would be reversed. In addition (2), (3) and (4) imply that $(Ir + Cr)$ and $(Ir - Sr)$ are of the same sign as Lr, for otherwise the inequality sign would again be reversed. It would seem, however, that Lr and $(Ir - Sr)$ are almost certain to be negative, so that the inequalities can remain as written above.

then the L.H.S. is < 0; the IS schedule is downward-sloping and the stability condition is automatically satisfied. Consequently, A (in Fig. 2B) is a position of stable equilibrium. Alternatively, if Iy is $>$ Sy, then the L.H.S. is > 0 and the IS schedule is upward-sloping. Stability of equilibrium then requires that the IS schedule slopes upward less steeply than the LM schedule. Consequently, B is a position of unstable equilibrium, while C and C′ are stable.[18]

The above argument can be expressed in a non-mathematical form. At any level of income, where the IS schedule lies above the LM schedule, the actual rate of interest (given by the LM schedule) is less than the rate of interest necessary for equilibrium in the goods market. It follows that an excess of *ex ante* investment over *ex ante* saving appears, and income increases. If income is increasing towards equilibrium at A, then Iy is $<$ Sy and the increases in income progressively eliminate the inequality. Alternatively, if income is increasing towards C or C′, the rising rate of interest depresses investment and stimulates saving and outweighs *eventually* the effect of Iy being $>$ Sy. Again the inequality is progressively eliminated as equilibrium is approached. On the other hand, at any level of income where the LM schedule lies above the IS schedule, the reverse argument applies and income decreases towards A or C (or C′). Therefore, if the System is out of equilibrium, any change in income is towards either A or C (C′), and away from B. B is a position of unstable equilibrium, while A and C(C′) are stable.

V

We begin our analysis of the cycle by assuming that the economy is initially in equilibrium at A. When income is low, gross investment is low and may not be sufficient to cover the replacement of worn-out capital equipment. If this is so, net investment is negative, and, allowing for long-period effects, the stock of capital falls. In addition, bunching of innovations may occur. Both these long-period changes stimulate investment, and as a higher rate of interest is now necessary, at all levels of income, to maintain the equality of *ex ante* saving and *ex ante* investment, the IS schedule shifts upwards. Initially, income rises gradually as the equilibrium position at A moves to the right.[19] The upward movement in the IS schedule brings A and B closer together until they eventually coincide when the LM schedule becomes tangential to the IS schedule at A + B (Fig. 3).[20] The economy is now

18. It is not necessary to assume that Sr is > 0 for the above argument to hold. Sr can be < 0 so long as the negative sign of (Ir − Sr) is unaffected, i.e. so long as Sr $>$ Ir.

19. Any upward shift in the consumption function reinforces this upward movement of the IS schedule. However, we cannot rely on such a change. In fact, the consumption function could initially move in an offsetting way, if the effect of a rise in income is to induce consumers to pay off accumulated debts and restore past savings, rather than to restore some previously attained standard of living.

20. This tangency may be hastened by a downward movement in the horizontal section of the LM schedule. If expectations regarding the minimum safe rate of interest are influenced by the rate that has ruled in past periods, and if the current rate has ruled for some time, then the LM schedule shifts downwards and helps produce the upswing.

unstable in an upwards direction, and, with My = 0, income expands in a cumulative upswing towards C. If My > 0 so that LM″ is the appropriate schedule, income expands towards C′.

When the system is out of equilibrium, assuming unchanging lags in the multiplier process, the rate of change of income is proportional to the difference between *ex ante* investment and *ex ante* saving.[21] An

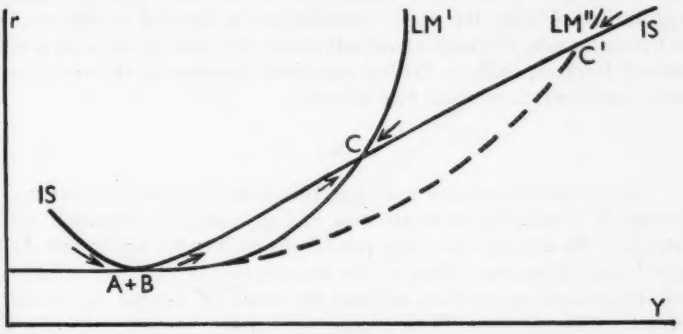

FIG. 3

inspection of Fig. 3 shows that in the initial stages of the upswing, the excess of *ex ante* investment over *ex ante* saving grows, for Iy is > Sy and the rate of interest is exerting either a small or no offsetting influence. In the later stages of the upswing, the influence of the rate of interest is stronger, and outweighs the effect by Iy being > Sy, so that the *ex ante* gap is progressingly lessened. It follows that (assuming My is not subject to significant variations), the upswing will be characterized first, by a stage when the rate of increase of income is rising, and second, by a stage when the rate of increase of income is falling.

If the value of My is sufficiently large and the IS schedule retains its upward slope, then the income level corresponding to full employment is eventually reached. However, it may be true that, at high levels of investment, the marginal propensity to invest falls as a result of, for example, a rising supply price of capital equipment.[22] If the fall in the marginal propensity to invest makes Iy < Sy, then the IS schedule slopes downwards once again (see Fig. 6). This may mean that a regime of cheap money may not be adequate, by itself, to produce full employment.[23]

If full employment is achieved while an *ex ante* gap of investment over saving persists, then inflationary increases, in the general level of prices and money incomes, result (the supply of output becoming in-

21. Samuelson *op. cit.*, p. 278. Samuelson's formulation of this proposition has been modified so that it holds not only in the case where the multiplier process involves an output lag, but also when a consumption lag is involved.

22. Kaldor, *loc. cit.*, p. 81.

23. We rule out the possibility of a zero or negative rate of interest.

elastic). If we assume that the demand for active balances is a function of the price level as well as the level of real income, and that the money supply becomes inelastic once inflationary pressure appears, then the rise in prices and money incomes can only be a temporary phenomenon. For the rise in prices increases the demand for active balances at each level of real income, and shifts the LM schedule to the left. This process raises the rate of interest, eliminates the *ex ante* gap and restores equilibrium. Either the upper equilibrium is reached in this manner, or the expansion is brought to a halt before full employment by a rising rate of interest, or by a falling marginal propensity to invest, or by some combination of these two effects.

VI

Given that the economy is in equilibrium at C (or alternatively, if income is displaying a small and falling rate of increase), we re-introduce the appropriate long-period effects into the argument. At the high levels of income ruling in the boom, gross investment is high and net investment is positive, so that the stock of capital equipment is growing through time. With income stationary (or alternatively, displaying a small and falling rate of increase), this growth of capital entails the gradual appearance of surplus capacity. It is the growing surplus capacity that is crucial, for it implies that the current rate of profit falls and that expectations as to the future profitability of investment projects are revised, and are now less favourable for further investment. Any bunching of innovations is unlikely at this stage, and the depressive effect of capital accumulation on investment is almost certain to be dominant. Investment falls and, at any level of income, a lower rate of interest suffices to equate *ex ante* saving and *ex ante* investment. Consequently, the IS schedule shifts downwards as the stock of capital grows. The initial effect of these shifts is to restore a situation comparable to that depicted in Fig. 2B—the IS and LM schedules again intersect at three points, A, B and C. As the IS schedule continues to shift, B and C are brought closer together and income gradually falls. The process is cumulative, for any fall in income implies that surplus capacity appears more rapidly. Therefore, the downward shifts in the IS schedule proceed more rapidly.

The revision of expectations associated with the growing surplus capacity, may produce a liquidity crisis. Falling money values of financial assets may lead to the general expectation that further falls are imminent. The demand for idle balances increases, and, at any level of income, a higher rate of interest is necessary to ensure monetary equilibrium. The LM schedule (or its upward-sloping section) shifts to the left.

These relative shifts in the IS and LM schedules eventually bring them into a tangential relationship at B + C (Fig. 4). The economy is now unstable in a downwards direction, and a cumulative downswing commences towards the lower equilibrium position at A.

In Fig. 4, only one LM schedule is drawn. This is drawn on the assumption that My is > 0. The implied contraction of the money supply on the downswing delays the falls in the rate of interest. The *ex ante* gap of saving over investment is eliminated less rapidly, and the downswing proceeds more rapidly than would be so when My $= 0$.

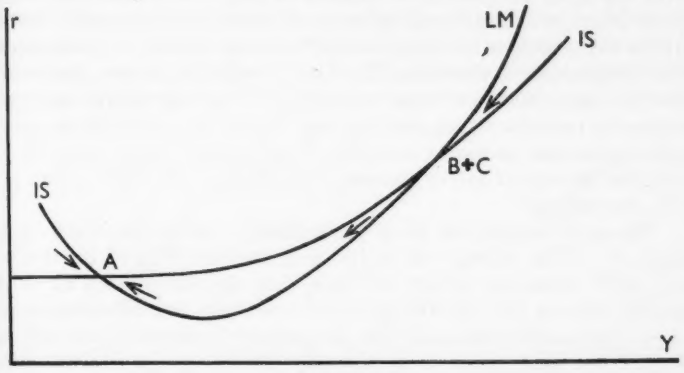

FIG. 4

On a strict interpretation of the IS schedule, the representation of the upper turning-point and downswing in Fig. 4 may be misleading. The derivation of the upward-sloping section of the IS schedule depends on the assumption that surplus capacity is eliminated. It follows that, with the appearance of a growing surplus capacity at the end of the boom and associated revision of expectations, the upward-sloping section of the IS schedule loses its relevance. In Fig. IA, as the family of investment schedules shifts to the left, the schedules I_3 and I_4 collapse and merge with I_2. The positions of equilibrium that are depicted on the upward-sloping section of the IS schedule are no longer possible positions of equilibrium. This irreversibility of the IS schedule emphasises the part played by expectations in the timing of the crisis and the commencement of the downswing. For although it is the growth of capital which ensures the revision of expectations, it is the latter which determines the precise moment[24] when investment is independent of income and only the downward-sloping section of the IS schedule is relevant. However, saving is still dependent on the level of income, and the *ex ante* excess of saving over investment is therefore made very large indeed. As the rate of fall of income is proportional to this excess, the onset of the downswing and its subsequent speed are made more spectacular and catastrophic. It is very easy to identify the revision of expectations and the alteration to the IS schedule outlined above as

24. If expectations are revised gradually, and there is no general crisis, then investment becomes independent of income when the process of revision is complete. As long as some investment, which is dependent on income, is proceeding, then the onset of the downswing and the downswing itself are correctly depicted in Fig. 4.

similar to Keynes' notion of ". . . a sudden collapse of the marginal efficiency of capital."[25]

On the downswing (following Duesenberry[26]), any attempt by consumers to maintain their standard of living shifts the consumption function upwards. This is not a parallel shift and involves a lowering of the marginal propensity to consume as well. Two important results follow. First, the lower equilibrium at A is moved to the right, for the shift in the consumption function shifts the downward-sloping section of the IS schedule to the right. The floor to output is higher than would otherwise have been the case. Second, the lowering of the marginal propensity to consume implies that each fall in income involves a more rapid elimination of the *ex ante* gap of saving over investment. It follows that the rate of fall of income is lowered and the downswing proceeds less rapidly.

The cycle is complete when the economy reaches the lower equilibrium at A. The wastage of capital and the bunching of innovations again shift upwards the IS schedule, and the elimination of excess capacity ensures that the IS schedule resumes its characteristic shape. A new cycle can be generated when the relative positions of the LM and IS schedules again make the system unstable in an upwards direction.

VII

It will be apparent that the model of the cycle presented above is closely related to Kaldor's model.[27] The relationship between the two models can best be investigated by examining the working of our model when the interest-sensitivities of saving and investment are both negligible. In this case, the diagrammatic presentation of the model, in terms of the IS and LM schedules, breaks down, because occurrences in the money market cease to be relevant. The cycle then becomes a product of the forces at work in the goods market alone. Such a case is shown in Fig. 5, where it is assumed to be typical that, at high levels of income, the marginal propensity to invest is less than the marginal propensity to save.

Saving is treated as a linear function of income, and although this is not typical in Kaldor's model, it is mentioned as a possible case.[28] Fig. 5A shows the three positions of equilibrium. The cycle can then be produced by the appropriate shifts in the investment schedule as outlined above and by Kaldor. Figure 5B shows the onset of a downswing.

25. J. M. Keynes, *The General Theory of Employment Interest and Money* (Macmillan, London, 1936), p. 315.

26. J. S. Duesenberry, "Income-Consumption Relations and their Implication", in L. A. Metzler and others, *Income, Employment and Public Policy: Essays in Honour of Alvin Hansen* (New York, 1948).

27. "A Model of the Trade Cycle", *loc. cit.* It is also closely related to a series of models which depend basically on the interaction of the income and capital stock effects on investment. Cf. R. M. Goodwin, "Econometrics in Business-Cycle Analysis", in A. H. Hansen, *Business Cycles and National Income* (New York 1951), pp. 417-68. For an account similar to the model of Fig. 5, see K. A. Kurihara, *Introduction to Keynesian Dynamics* (London, 1956), pp. 122-6.

28. *Ibid.*, p. 82.

The effect of a shift in the consumption function, once the downswing commences, is shown by the saving schedule moving to the broken line, S′. The significance of this change is to move the lower equilibrium position from A to A′.

Kaldor also relies on shifts in the savings schedule to help produce the upper and lower turning-points.[29] In the above model it is not possible to reproduce these shifts, because saving is treated as a function of the level of income, and not of the level of "economic activity".[30] In the long period in Kaldor's model, when changes in the capital stock remove the proportional relationship between income and economic

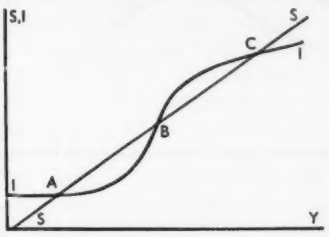

FIG. 5A

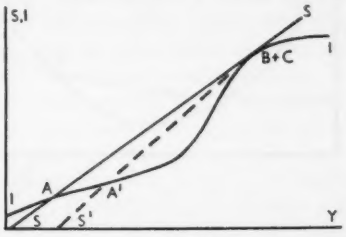

FIG. 5B

activity, changes in income per unit of activity produce changes in saving per unit of activity and shift the savings function. Further, in both models, the investment schedules shift as a result of long-period changes in the rate of profit on capital. Any given change in investment, if the proportional relationship between income and economic activity is absent, means that the change in investment per unit of income differs from the change per unit of activity. Thus, the shifts in the investment schedules in the two models are of a different order. These differences between the two models arise purely because, in Kaldor's model, saving and investment are treated as functions of economic activity and not of income. Nevertheless, the explanations of the turning-points in Kaldor's model and in the model of Fig. 5 are identical. Any turning-point depends on a discrepancy appearing between *ex ante* saving and *ex ante* investment at *all* the neighbouring levels of income, or of economic activity. Kaldor shows this effect occurring at a particular level of economic activity, and we show it occurring at a particular level of income. The differences between the two models are indicative of this fact alone and no other.

If the interest-sensitivities of saving and investment are significant, then a close approximation to Kaldor's model can be analysed in terms of the IS and LM schedules (Fig. 6), with the advantage that monetary effects are explicitly introduced into the analysis.

In Fig. 6, the upper equilibrium position occurs at a stage when costs of borrowing are rising—the LM schedule is rising—and costs of

29. *Ibid.*, pp. 83-5.

30. *Ibid.*, p. 79. Kaldor assumes that economic activity is measured by employment. On the assumption of II above there will be a proportional relationship between employment and income in the short-period.

capital goods construction are rising,[31] so that Iy is < Sy and the IS schedule is falling. A cycle can be produced on the basis of the schedules in Fig. 6 in exactly the same way as in sections 5 and 6 above.

FIG. 6

VIII

The analysis of the cycle presented above contains no explicit reference to economic growth. A few examples may suffice to show that the model will exhibit growth:

(i) as long as each upswing reaches a new peak of income, the "Duesenberry effect" on the downswing acts as a ratchet and ensures that, for each successive cycle, the IS schedule lies further to the right;[32]

(ii) for this to be possible, there must be secular growth of the money supply so that the LM schedule is drawn out further to the right for each successive cycle. Otherwise, the upswing is choked by dear money and a new peak of income is not attained;

(iii) the irreversibility of the IS schedule on the downswing ensures that each upswing need not be a repetition of previous upswings;

(iv) technical progress, besides directly stimulating investment and affecting the duration of the boom and slump, may also affect the value of Iy. Any alteration in Iy affects the steepness of the slope of the IS schedule, and therefore, the speed and amplitude of the upswing;

(v) technical progress influences the duration of the boom by affecting the gestation period of investment, and the duration of the slump by affecting the wastage rate of capital equipment;

(vi) population growth, technical progress and capital accumulation continually raise the full employment level of income. If this ceiling becomes operative (bearing in mind the possibility

31. *Ibid.*, p. 81.

32. Cf. R. C. O. Matthews, "The Savings Function and the Problem of Trend and Cycle", *The Review of Economic Studies*, Vol. XXII, 1954-5.

of a bout of inflation), the actual rate of growth of the system is influenced.

These examples also illustrate the view that growth should be regarded as a product of the cycle—of the duration and amplitude of the swings of economic activity. Even long-run phenomena such as technical progress and population increase affect growth by influencing the character of the cycle. These propositions seem very trite, but they imply that it is a mistaken conception to think of the cycle as a series of deviations from any independently determined equilibrium rate of growth. During any cycle long-period equilibrium is never achieved because capital is never perfectly adjusted to output. The extent of the departure from any long-period equilibrium depends on the operation of various lags and on the behaviour-patterns of economic units. It is these series of maladjustments, developing over the cycle, which govern the character of the cycle and of any resultant secular growth of output. We might characterize this secular growth as a trend rate of growth of output, but there is no reason to suppose that this is *identical with* an equilibrium rate of growth (e.g. Harrod's G_w), or *tied to* a full employment rate of growth (e.g. Harrod's G_n, or Joan Robinson's "Golden Age"). Consequently, if we reverse the procedure suggested above and postulate a moving equilibrium, with the cycle described as a series of deviations from this equilibrium, we cannot claim to be explaining both the cycle and the growth of the economy. All we are doing is describing a cyclical mechanism, and by implication, demonstrating the instability of an equilibrium rate of growth. This instability is not surprising as the concept excludes lags and requires the behaviour-patterns of an idealistic world.

The significance of the concept of an equilibrium rate of growth lies mainly in the realm of political economy, where our interest is to make the rate of growth of an economy change in a favourable manner. Indeed, it is possible to argue that its use should be confined to the political economy of full employment, where the Keynesian devil has been chained and effectively banished. Certainly, its use to help provide a theoretical explanation of the economic growth of a capitalist system (where the government plays a passive role), only causes confusion, and leaves economists open to the charge that they "... explain with much pomp and circumstance a nation's economic growth by that nation's propensity to grow".[33]

Our conclusion is that a theory of the economic growth of a capitalist system must be the product of a detailed study of the cycles which produce this growth. Until economic growth can be integrated into models of the cycle in this way, cycle models are best derived independently of the question of growth.

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33. Paul A. Baran, review of W. W. Rostow's, *Process of Economic Growth, American Economic Review*, 1952, p. 923.

NOTE

FOUR YEARS OF RETAIL TRADING SURVEYS IN NEW ZEALAND

This paper analyses some results of the complete census of distribution for the year ended 31st March 1953 and of the quarterly sample surveys of retail trading begun in the first quarter of 1954. Figures for total retail sales during March years are set out in Table 1 along with estimates of volume of sales, found by correcting for movements in all retail prices. Volume of sales per head and per capita real disposable private income in these years are also shown in the table; the latter for purposes of comparison.

TABLE I

March Year	Value of all Retail Sales £m.	Volume of Retail Sales 1949 £m.	Volume of Retail Sales per head 1949 £	Per capita Real Disposable Private Income—1949 £
1952-3	328·7	255·0	126·9	217·7
1954-5	364·7	259·6	123·3	231·6
1955-6	375·1	260·8	121·3	234·1
1956-7	381·8	255·0	116·2	231·2

Although the value of retail sales increased each year, the volume of sales increased to a much smaller extent in 1954-5 and 1955-6 and in 1956-7 actually declined so that the volume of sales in the last year was no greater than four years earlier. Taking population increase into account, the volume of sales per head fell each year. This is surprising, to say the least, in view of the increases in purchasing power per head in 1954-5 and 1955-6 and the relatively small decrease in 1956-7. Disposable private income has to be used to measure purchasing power because no estimates of disposable personal income are available for the last two years. This is, however, unlikely to make much difference because there was a considerable change in the proportion of retained profits to gross company income between 1952-3 and 1954-5 yet the rise in disposable personal income was only 1 per cent different from the rise in disposable private income.

These puzzling results may be entirely the consequence of deficiencies in the sampling procedures used for the quarterly surveys, for estimates of retail sales since the census are likely to be under-estimated to some extent because the same shops are used in each survey and there is no provision for new businesses. Thus new shops opened in areas of growing population do not affect the sample at all. The degree of understatement cannot, however, exceed the rate of population growth unless a shift in business from old to new shops takes place. In other words, to divide volume of sales by actual population may understate per capita volume of sales but to assume an unchanging population is likely to overstate it; the true figure lies probably somewhere in between. In

order to guard against understatement, per capita sales volume may be found by dividing each year's volume of sales by the 1952-3 mean population; this yields the following:

1952-3 ..	£126·9 real sales per head	cf.	£217·7 real income per head
1954-5 ..	£129·2 " " " "	"	£231·6 " " " "
1955-6 ..	£129·8 " " " "	"	£234·1 " " " "
1956-7 ..	£126·9 " " " "	"	£231·2 " " " "

These figures certainly look more plausible.

In order to examine the course of retail sales since 1952-3 in more detail the quarterly estimates of sales value were each deflated by the corresponding quarterly price index and mean population. The results are shown in Table II.

TABLE II

Period	Value of all Retail Sales £m.	Volume of Retail Sales per head 1949 £m.	Volume of Retail Sales 1949 £
Quarter ended Mar. 1954 ..	81·0	58·8	28·3
" June "	88·6	63·3	30·3
" Sept. "	87·7	62·6	29·9
" Dec. "	102·6	73·4	34·8
Quarter ended Mar. 1955 ..	85·8	60·5	30·0
" June "	91·6	64·0	28·5
" Sept. "	91·4	63·7	29·7
" Dec. "	104·2	72·7	33·7
Quarter ended Mar. 1956 ..	87·9	60·5	27·9
" June "	82·8	62·9	28·9
" Sept. "	91·6	60·8	27·8
" Dec. "	106·7	70·8	32·2
Quarter ended Mar. 1957 ..	90·6	60·6	27·4
March, year 1953 ..	328·7	255·0*	126·9*
" " 1955 ..	364·7	259·8*	123·5*
" " 1956 ..	375·1	260·9*	121·3*
" " 1957 ..	381·8	255·1*	116·3*

* These figures are found by summing the appropriate quarterly volumes.

The more refined method of deflation makes practically no difference to the annual volume estimates, but setting out the quarterly figures shows that the first decline in per capita sales volume occurred in the June quarter of 1955. If, however, we agree not to adjust for population increase, the first decline appeared in the December quarter of 1955 and there is evidence of recovery in the March quarter of 1957.

It is possible to apply better corrections for price changes by deflating estimates of the retail sales of groups of commodities by the appropriate indices of sub-groups of the Consumers' Price Index. The commodity groups for which this is possible are food, clothing, footwear, household durables, and other commodities. Sales of builders' hardware must be excluded from retail sales in these calculations as

there is no corresponding price index. The sub-groups of the Consumers' Price Index not required are housing, fuel and lighting, and services. As the indices for these sub-groups moved rather differently from the others during the period, the estimates of sales volumes are likely to be considerably improved. The results of these calculations appear in Table III.

TABLE III

Per Capita Volume of Retail Sales, excluding Builders' Hardware

Period	Food £	Clothing £	Footwear £	Household Durables £	Other Commodities £	Total Sales £
Mar. 1954	9·2	4·7	0·7	4·3	9·3	28·2
June ,,	9·0	5·8	0·9	5·1	9·4	30·2
Sept. ,,	9·2	5·1	0·7	5·4	9·7	30·1
Dec. ,,	10·0	6·3	1·0	6·2	12·0	35·5
Mar. 1955	9·1	4·8	0·7	4·8	9·9	29·3
June ,,	8·7	5·7	0·9	5·3	10·1	30·7
Sept. ,,	9·1	5·2	0·7	5·4	10·1	30·5
Dec. ,,	9·7	6·2	0·9	6·1	12·0	34·9
Mar. 1956	8·8	4·8	0·7	4·8	9·6	28·7
June ,,	8·6	5·6	0·8	5·1	9·7	29·8
Sept. ,,	8·5	4·9	0·7	5·1	9·8	29·0
Dec. ,,	9·2	6·0	0·9	6·1	11·6	33·8
Mar. 1957	8·5	4·6	0·7	4·6	9·8	28·2
1952/3 ..	38·9	22·4	3·2	20·0	39·5	124·0
1954/5 ..	37·3	22·0	3·3	21·5	41·0	125·1
1955/6 ..	36·3	21·9	3·2	21·6	41·8	124·8
1956/7 ..	34·8	21·1	3·1	20·9	40·9	120·8

These results are rather more easy to accept. Per capita sales volume of food and apparel fell steadily each year, but of household durables and other commodities rose until 1955-6 and then dropped in 1956-7. Consequently per capita total volume in 1954-5 was up about 1 per cent, in 1955-6 down slightly, and in 1956-7 down over 3 per cent. Remembering the earlier discussion about understatement of sales, it thus seems likely that per capita volume of sales really rose each year until 1955-6 but that there was a significant fall in the last year.

The price movements for these commodity groups are of interest. In Table IV each group is expressed as a proportion of the all-groups index; these are shown only for complete years.

We note that (until 1956-7) per capita volume of sales of household durables and other commodities expanded accompanied by a considerable fall in the relative prices of these goods; food sales fell while food prices on the whole went up, and clothing sales fell in spite of quite a fall in price. Footwear sales remained at much the same level, as did the price of footwear.

Three conclusions seem justified by these results. The first is that deficiencies in the quarterly surveys may exist and another complete

TABLE IV

Retail Prices of Selected Commodity Groups

Period	Food	Clothing	Footwear	Household Durables	Other Commodities
1952/3 ..	1119	987	1073	899	878
1954/5 ..	1138	977	1067	819	814
1955/6 ..	1137	968	1072	790	797
1956/7 ..	1166	928	1062	776	797

census of distribution should be taken as soon as possible* to establish their importance, and the sampling technique should be modified to allow for additional businesses. The second is that deflation of aggregate retail trading estimates by the all-groups price index leads to serious understatement of real sales because of the very different changes in price recorded by sub-groups; another factor of importance is the much greater proportion of total sales accounted for by household durables than is the weight given to this group in the price index (which is based on replacements only). The third is that in spite of all allowances real sales per person in 1956-7 appears to have declined to quite a marked extent.

It is not easy to explain the small rise in real sales per person in 1954-5 (compared with 1952-3), its stability in 1955-6, and the much greater fall in 1956-7. No clear explanation is suggested by fluctuations in housing activity, motor car imports, or small savings—three obvious series to look at in this connection. The number of housing permits issued rose in 1954-5, remained about the same in 1955-6, and fell a little in 1956-7; motor car imports were up in 1954-5 and again in 1955-6, but down in 1956-7; these movements clearly throw no light on sales behaviour. Small savings certainly rose strikingly in 1956-7 by about £8m. compared with the negative level of about £1m. for 1955-6, but small savings in 1954-5 were £6m. (and £4m. in 1952-3), so that again no very precise connection between savings and retail expenditure can be reasonably deduced.

These puzzling observations can, however, be somewhat reconciled if the estimates of real per capita disposable income in Table 1 are accepted. According to these calculations income increased much more in 1954-5 than in 1955-6, and the 1955-6 increase was again greater than in 1956-7, when it in fact fell. The increase in 1954-5 was thus perhaps sufficiently great to allow for increased savings as well as increased expenditure on houses and motor-cars and other goods, whereas the 1955-6 increase was enough to finance a high level of total expenditure but at the expense of savings. Finally, the decrease in income in 1956-7 may have required a reduced expenditure on housing and motor-cars in order to permit savings to be increased and retail purchases to be maintained.

* Another census is to be taken for the year ending 31st March, 1958.

Finally, it is instructive to compare the estimates of retail sales provided by the surveys with those of personal expenditure on consumer goods and services given in the national income statistics.

Year	Retail Sales £m.	Index	Personal Expenditure—£m.	Index
1952-3	329	100	470	100
1954-5	365	111	612	130
1955-6	375	114	648	138
1956-7	382	116	672	143

The marked disparity in the movements of the two series between 1952-3 and 1954-5 is very disturbing. Deficiencies in the retail trading sample can hardly account for it all, and some doubt must attach to the national income estimates of personal expenditure, for it is scarcely credible that expenditure on goods and services not included in retail sales increased as much as the figures suggest. The relative movements between 1954-5 and 1956-7 are, on the other hand, quite consistent.

J. W. Rowe

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NEWS AND NOTES

Professor F. R. E. Mauldon, who has occupied the Chair of Economics in the University of Western Australia since 1941, retires in 1958. His successor, Professor Ian I. Bowen, who has been Professor of Economics in the University of Hull since 1947, is expected to arrive in Perth in August.

A three months' course for central bankers, known as the "Central Banking Course — S.E. Asia, New Zealand and Australia" (SEANZA) ended on 5th December at the Commonwealth Bank's residental training college, Kirribilli, Sydney. It was sponsored by the central banks of Australia, Ceylon, India, New Zealand and Pakistan and was attended by student-members from these banks, from the Bank of England and the South African Reserve Bank and from central banks or Treasuries of other Colombo Plan countries—Burma, Indonesia, Japan, Malaya, Nepal, Singapore and Thailand. Sir Leslie Melville (Australian National University) was Principal, and Mr. A. R. Low (Reserve Bank of New Zealand) was Deputy Principal. They were assisted by officers from other sponsoring central banks. Visiting experts included leading Australian economists and senior Commonwealth Bank officials, as well as such well known overseas economists as Mr. E. M. Bernstein, Prof. J. B. Condliffe and Dr. P. S. Lokanathan.

The objects of the course were to assist in the development and training of officers for higher central bank executive positions and to build up a knowledge of central banking, with particular reference to conditions in South-East Asia, New Zealand and Australia.

The Thirty-third Meeting of the Australian and New Zealand Association for the Advancement of Science is to be held in Adelaide from the 20th to the 27th August, 1958. The local committee of Section G (Economics, Statistics, and Social Science) is arranging a programme in consultation with the section president, Mr. A. R. Low, of the Reserve Bank of New Zealand, Wellington. The programme is to include symposia and individual papers which should appeal to a wide audience.

Offers to contribute to the programme should be sent by 1st April, 1958, to the honorary local secretary of Section G, Professor R. L. Mathews, Dept. of Commerce, University of Adelaide, South Australia. The papers themselves should be submitted to the Secretary by 1st June, 1958, in order that they may be considered by the local committee. Arrangements will then be made for the printing of papers which are accepted. Papers should be as short as possible and in any case should not exceed 5,000 words in length.

List of Branch Secretaries

New South Wales: J. R. Wilson, c/o Department of Economics, University of Sydney, Sydney, N.S.W.

Victoria: D. M. Hocking, Department of Economics, University of Melbourne, Vic.

Queensland: G. Price, Department of External Studies, University of Queensland, St. Lucia, Brisbane, S.W.6, Queensland.

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Dunedin: W. A. Poole, University of Otago, Union Street, Dunedin, N.Z.

REVIEWS

Sterling and Regional Payments Systems. By J. O. N. Perkins. (Melbourne University Press, Carlton, Victoria, in association with the Australian National University, 1956.) Pp. 171. 30/-. Aust.

In a thoughtful, carefully reasoned analysis, Dr. Perkins has made an important contribution to an understanding of the operations, policies, advantages and disadvantages of the Sterling Area dollar pool and of the European Payments Union. The appraisal of these regional systems has two main purposes: (1) to determine whether they contributed to the rebuilding of trade and to an increase in real income within the nations concerned; and (2) to consider whether such institutions may have a role to play in a world of currencies more freely convertible than that which was the setting for their establishment.

Early in the study Dr. Perkins reaches the conclusion that present arrangements for pooling dollars have marked superiority for the Sterling Area over possible alternatives. The alternatives considered include the maintenance of the whole or a part of its gold and dollar reserves by each country; and the establishment of a centrally organized and directed system for the allocation of dollars. Fragmentation of reserves would have compelled the separate nations to impose more severe dollar restrictions than was the case and standards of living would have been less than were attained in the post-war period by reason of the need to offset trade balances on a bilateral basis. Although a centrally organized system for allocating dollars might have had more success than was actually achieved in distributing dollars in directions most likely to check inflation, thus improving the Sterling Area's balance of payments, it was not administratively feasible. Existing arrangements often operated in ways that can be criticized, but there is no reason to believe that any alternative would have better served the interests of world trade, or of the Sterling Area, than the system which was in fact adopted.

In considering the effect of the dollar pool upon trade, Dr. Perkins concludes that it had the advantage of keeping open the channels of trade between the United States and the dollar deficit members of the Sterling Area. It facilitated the necessary long-term adjustments with a minimum of distortion of patterns of trade.

The European Payments Union made possible a considerable expansion of European trade, encouraging the members to import more freely from one another, and increased the ease with which the outer Sterling Area purchased in the European market. The Dominions in particular benefited from the lower costs of European manufacturers. The fact that each member held its own gold and dollar reserves gave to each a direct incentive to economize on dollar spending, to direct exports to the dollar area and to prevent trade balances from diverging

too greatly from equilibrium. Finally, the European Payments Union provided a useful forum for the discussion of current problems.

Dr. Perkins envisages a continued need for the Sterling Area dollar pool and for the European Payments Union. He does suggest certain administrative modifications. Those he proposes in connection with the dollar pool have to do with the granting of bonuses and the imposition of penalties of such a character as to encourage exports to and to discourage imports from the dollar area. The modifications he proposes in the structure of the European Payments Union also have as their purpose the encouraging of members to improve their dollar position. He concludes that even if monetary co-operation should develop on a wide-scale there still would be need for both types of systems.

The author bases this conclusion on certain evaluations of American action and policy. Thus he feels that the American market may be unstable, that American imports and foreign lending may be reduced, and that nations dependent upon the American market are exposed to the sort of instability that may result from periodic recessions. Dr. Perkins does not envisage unfavourable developments of this type as certainties. They are possibilities rather than probabilities, but because they may occur he concludes that defensive systems are necessary, in the form of the Sterling Area dollar pool and of the European Payments Union, to be used in case of need.

I feel that offsetting Dr. Perkins' forebodings, at least in part, there are several developments which tend to make the United States a better behaved member of the international economy of the free world. Thus public attitudes, in consequence of the experiences of the Great Depression, are such in the United States that the federal government would be compelled to take immediate and positive action in the event of a serious decline in business activity. The inaction of the Hoover Administration would not be countenanced. The declines of business activity which have taken place in the United States in the post-war period, 1949 and 1954, have been minor recessions, mere ripples on the surface. The United States has supplied and is continuing to supply a large volume of dollars to the outside world. Imports, tourist expenditures and private foreign investment have all risen. The demand for imports will show a continuous rise by reason of the progressive exhaustion of America's industrial raw materials. Moreover, tariff rates have been progressively reduced, though in the case of some commodities they are still inordinately high, and tariff administration has been simplified. Returning tourists are now permitted to bring in goods to the value of $500 duty free instead of the $100 previously allowed.

The United States Government, in the period from July 1, 1945 to June 30, 1956, has extended grants to foreign nations of $31 billions and extended loans to an additional $13 billions. This is exclusive of military aid. In consequence of these developments the dollar no longer seems a scarce currency. Over the past four years, foreign short-term dollar assets have increased from $10 to $13 billions. The gold stock of

the United States is less than it was at the end of 1950. New gold production has gone either into industrial use or into the reserves of other central banks. The situation has vastly improved over that existing at the time Dr. Perkins wrote his study.

The increased availability of dollars and the rapid economic recovery in Western Europe have made it possible for several of the European currencies to become convertible, *de facto*. The United Kingdom itself has taken a number of important steps towards convertibility and the time would now seem opportune for her to extend convertibility to non-resident current sterling. Were she willing to take this action she could doubtless secure credits in the American market, from the Export-Import Bank, from the Federal Reserve System and, of course, from the International Monetary Fund. Convertibility even of this limited type would be a great boon to Australia and to other members of the Sterling Area.

Although Dr. Perkins does not recommend that the United Kingdom at this juncture make non-resident current sterling convertible, he does, in his excellent study, provide an indispensable background for an understanding of the issues involved and of the implications of convertibility. The two payment systems, which he discusses so ably, have made important contributions to the rebuilding of world trade and to increases in real income, and are necessary preludes to the ultimate goal of an elimination of exchange restrictions.

B. H. BECKHART

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Introduction to Keynesian Dynamics. By KENNETH K. KURIHARA. (George Allen and Unwin, London, 1956.) Pp. 222. 21/- stg.

Any attempt to provide an introductory book which takes account of recent economic developments otherwise only to be found in journal articles and specialized essays is to be highly lauded. Kurihara has attempted such a task. His aim has been to provide "a coherent and compact study of macro-dynamic analysis in general". He has endeavoured to extend the analysis of Keynes's *General Theory* so as to cover dynamic trade cycle theories and secular growth theories. The fundamental relationships of the Keynesian system are set out in Part I. Part II shows how the system operates for a number of limited dynamic models, while Part III covers the field of growth theories made familiar by Domar and Harrod.

The conception of the book is undoubtedly sound. There is a great need for an elementary text covering the area of economics surveyed by this volume. Nevertheless, one cannot help wondering what type of student is going to find the study of this book the most rewarding. The analysis is presented in a form which is admirable for its restraint and praiseworthy for its conciseness. Yet this very brevity of expression contains the seeds of its own undoing and leads to an occasional lack

of precision. On the last page of Part I the reader is introduced hurriedly and inadequately to the accelerator. Its hasty union with the multiplier produces an offspring which is named and flung, incorrectly defined, into the last two paragraphs of this Part. It is autonomous and not induced investment that is the multiplicand of the super-multiplier.

Nearly all the dynamic models of Part II are little more than extensive applications of multiplier analysis using either the algebraic process of summing geometric progressions or the geometric one of step diagrams. The "super-multiplier" again lurks in the background, this time attached to its correct multiplicand, but just what family ties it has with Kaldor's non-linear investment function does not seem to be made clear. Several other minor imperfections may be mentioned. It is a pity to find differentials occasionally mixed with difference equations, while many of Keynes' long-term prognostications seem to have been accepted a little too readily.

In addition to contending with technical blemishes the beginner has to brave quite a lot of elementary algebra and geometry. Most of the algebra is used as a convenient shorthand method of expressing simple economic relations. While the mathematical equivalence of these two modes of expression is set out with great clarity the meaning of the algebraic forms is left a little obscure. This sort of approach may well provide a useful means of making students familiar with mathematical forms, though there is always the danger that it might scare more students than it assists. This, of course, is the eternal dilemma of mathematical economists.

Many students and teachers will undoubtedly find the book a useful one for reference purposes and despite the above criticisms there is a lot of very useful material within its covers. Nevertheless, there is much to be done before this book becomes an entirely satisfactory text.

D. COCHRANE

University of Melbourne.

Mathematical Economics. By R. G. D. ALLEN. (Macmillan, London, 1956.) Pp. 768. 90/9 Aust.

"The present work . . . aims at a fairly systematic treatment of some of the more important and simpler parts of mathematical economics." (p.v.) "It is introductory, but it is not elementary. It is directed to the economist rather than to the mathematician, but it assumes some little mathematical background" (p. xiii).

This is an exact description of *Mathematical Economics.* But I would emphasize that the treatment is highly selective and, usually, penetrates only a short distance. Allen's purpose is to inform economists who are moderately literate in mathematics of the potentialities of mathematics in economics. In this aim he succeeds brilliantly.

"The kind of mathematics set out in . . . [Allen's earlier *Mathematical Analysis for Economists*] . . . is assumed throughout, that

is a good deal of calculus and some algebra and geometry. The main concession is that time is taken out at convenient places to introduce more advanced mathematical techniques, at the cost of disturbing the flow of the economic development'' (p. xiii). It is possible that the fear of encountering ''more advanced'' techniques may deter some potential readers. But it is unlikely that any economist who safely negotiated *Mathematical Analysis* would have difficulty with *Mathematical Economics*.

Three main topics are covered. Chapters 2-3 and 7-9 are devoted to the macro-dynamic models of Keynes, Harrod, Samuelson, Hicks, Goodwin, Kalecki and Phillips. The necessary mathematics—complex numbers, linear differential equations, linear difference equations—is set out in Chapters 4-6. Then follows, in Chapters 10-11, 14 and 18-19, an exposition of the general equilibrium models of Walras-Leontief and Pareto-Slutsky-Hicks-Allen. The necessary mathematics—in this case, vectors and matrices—is provided in Chapters 12-14. Chapters 16 and 17 are concerned with linear programming; the prerequisite game theory is outlined in Chapter 15. Chapter 20 contains a brief discussion of some aggregation problems.

Allen's exposition is clear and orderly. Only in the quality of proof-reading does *Mathematical Economics* fail to live up to the standards of its predecessor.

MURRAY C. KEMP

McGill University.

An International Economy. Problems and Prospects. By GUNNAR MYRDAL. (Routledge and Kegan Paul, London, 1956.) Pp. xi + 381. 37/6 stg.

There are no indications that international income disparities are shrinking. On the contrary, the poor countries are becoming relatively poorer. Further, while income disparities are being reduced in the wealthy welfare States, they are becoming even more prominent in the poor countries. Indeed, the international policies of the wealthy countries—tariffs, other controls over imports and exchange, support prices—are themselves partly responsible for the growing international disparities.

Professor Myrdal has provided a rambling, somewhat dogmatic, but highly stimulating discussion of some of the problems posed by the co-existence of very poor and very wealthy countries. It is an eloquent plea for greater economic aid to the poor countries. And it is an indictment of the existing theory of international exchange. It is the best survey known to the reviewer of the whole literature on ''underdeveloped countries''.

Myrdal's typical poor country is characterized by a high ratio of labour to other resources, especially land, by a large pool of unemployed or under-employed agricultural labour, and by higher wages

and labour productivity in manufacturing industry. A negligible proportion of the national income is saved; hence, left to itself, the country would stagnate. The reduction or elimination by the wealthy countries of trade and migration barriers would be a move in the right direction but would provide only a small part of the total aid required. A rapid improvement in the standard of living in poor countries can be achieved only by rapid industrialization supported by large-scale loans or gifts by the wealthy countries It is Myrdal's view that only if aid is channelled through international institutions can the contributions be levied equitably and the allocations made to the most deserving.

Myrdal is convinced that import restrictions of one kind or another are a proper part of any programme of economic development. The section in which this thesis is developed (Chapter XIII) is likely to be the most interesting to the economist. But it is disappointing. The reader is pelted with disconnected fragments of arguments which are never fully developed and tied together. Nor is the logic always watertight. Thus at times Myrdal appears to argue that excess demand and exchange restrictions are inevitable by-products of rapid development and that import restrictions are the only way of dealing effectively with exchange difficulties. At other points Myrdal cites approvingly the argument developed by Raúl Prebisch (see United Nations, Economic Commission for Latin America, *The Economic Development of Latin America and its Principal Problems*, New York 1950). This argument has never convinced the present reviewer. That the gains from trade are falling, possibly so fast that the standard of living is falling too, does not appear to justify the abandonment of the remaining gains from trade.

MURRAY C. KEMP

McGill University.

The Cotton Industry in Britain. By R. ROBSON. (Macmillan, London, 1957.) Pp. xx + 359. 86/3 Aust.

Production and exports by the British cotton textile industry are now at their lowest levels for a hundred years past. Since the First World War the industry has been painfully contracting. This is the book to which anyone concerned to know the facts and figures on this decline should turn.

No one knows the subject better than Dr. Robson, who has been associated with the industry for the past twenty-five years and is now Director of the Economics and Statistics Department of the Cotton Board in Manchester. He has written a book which must be one of the most detailed accounts of any industry in any country. Yet this book has much interest, beyond the statistics and comments specific to the textile industry, as a case-history of redundancy and for the light it throws on general questions of the internal and external economies of scale, restrictive practices and the pros and cons of vertical integration.

The disadvantage of thus writing "from the inside" shows in a few

places where the author seems to be anxious to avoid giving any possible offence. For example, one would have welcomed a candid appraisal of the role of the U.K. Government in promoting conditions for the industry's survival in the future. And an omission, where so much detail has been given, is a table listing the principal multi-unit firms by name, locations, capacity, capital gearing and recent investment practices.

What is the moral of the history for Australia? In a note in the *Economic Record* for November, 1956, Dr. Robson has already written on the infant industry argument in relation to the protection of the cotton textile industry in Australia. The issue is whether Australia should pay the high price in tariffs or bounties that will be necessary to sustain or develop the industry in this country. The proportion of the Australian market for cotton textiles that is supplied from local production has risen since before the war from five per cent to over 15 per cent, but this is far below the target of 40 per cent which was set by the post-war planners. (The Australian industry makes medium to coarse counts of yarn and the corresponding piecegoods: fine cottons such as men's shirtings and women's dress materials are imported.)

Traditionally, the cotton textile industry has been the spearhead of industrial advance—witness Britain in the nineteenth and India and Japan in the twentieth century. This did not happen in Australia, because of the emphasis on wool usage and for other reasons. Dr. Robson points out (p. 279) that "the textile industry can be relatively easily established anywhere. This arises primarily from the fact that it is technologically mature, so that over a wide part of the whole range of textile manufacture competition does not consist in innovation, with the ever-present risk of obsolescence, but in mastering a recognized technique". Certain countries have an advantage in access to raw materials and to textile machinery; "otherwise competitive ability turns primarily on wage rates and so the textile industry tends to be attracted to low-wage areas, and as, moreover, the incidence of transport charges on the products of the industry is low, these low-wage areas tend to supply not only their own home market but also those of higher wage areas".

The implications for the Australian industry of this book and of the recent sharpening of international competition are not encouraging. In a high-wage country, the only hope of matching the low costs of Asian mills has been to mechanize. There is, indeed, no ground to doubt the claim of the Australian cotton textile industry to the Tariff Board that its physical productivity is among the best in the world. Unfortunately, high efficiency does not necessarily make this industry "economic", partly because of the costs of building and equipping mills and the heavy requirements for working capital in Australia, and partly because the technical superiority of new machinery is insufficient to drive out the old.

For example, in Britain less than one-fifth of the spinning and weaving capacity now in use has been newly installed since the war. According to Dr. Robson, "of the 440 spinning mills now running 275

were built before 1900" (p. 41) and the bulk of the existing machinery was installed "in a few boom years in the early 1900's" (p. 210).

Australian cotton mills accordingly face on the one side competitors with minimum wage costs and on the other competitors with negligible capital costs. There is a further disability in the small size of the Australian market, which militates against expansion of cotton printing from cloth imported in the grey, owing to the advantage of long runs enjoyed by both the Western and the Asian producers overseas. Throughout the world the Asian mills are scooping up more of the trade, especially in standard lines, so that even the capital-intensive American cotton textile industry has been conceded a low quota limit on imports of Japanese cloth to U.S.A.

In view of world competition and the challenge of rayon and synthetics, it is arguable that it may be wise to accept the fact that Australia has largely by-passed the cotton textile stage in her industrial development and to avoid further commitments in the future. In any event, when the Tariff Board and the Government come to reconsider this question, the book under review will be preferred reading.

DAVID S. HOPKINS

Melbourne.

Paradise of Dissent: South Australia 1829-57. By DOUGLAS PIKE. (Longmans, Green, London and Melbourne, 1957.) Pp. xii + 572. 70/- Aust.

Dr. Pike's book examines the origin and development of an Australian community on a scale which has hitherto been attempted only for New South Wales, the original colony. Even for New South Wales there is no single book which does quite what this does for South Australia, although a great number of special works have been devoted to its first generation. Dr. Pike's predecessors in this field—Mills, Price and others—have been concerned mainly with the formal aspects of "systematic colonization". He has a lot to say, and much that is new, about these; but he is also concerned with the fortunes, in their personal and detailed aspects, of the peculiar, obstinate, theorizing, groups and individuals who came to St. Vincent's Gulf to found a Paradise of Dissent, and succeeded rather in founding suburbs called Prospect and Paradise to which no trams ran on Sunday mornings. The narrative covers the first generation, from the theorists and promoters of 1829 to the securely established, prosperous and complacent society which entered upon self-government in 1857, with the Legislative Council now watching the propertied interests of the radical dissenters to whom the English Reform Bill of 1932 had once been a disappointingly conservative measure. A hasty concluding survey of some selected themes through later generations might better have been omitted, for the first generation of South Australia really ends with a question which requires another volume: Why did nothing happen in South Australia between 1857 and about 1937?

The systematic colonizers have been described before, but not with such intimate knowledge as Dr. Pike possesses. He regards Wakefield with a sceptical and more than faintly disapproving eye but, despite a consciousness of their occasional absurdities, has a sympathetic warmth of feeling for the obstinate Independents in religion who did actually keep the hierarchical churches in their place (i.e. no place at all) in the formal constitution of a new society.

Economic historians will find much useful information in this book. A formal economic history of South Australia would have to retell the story from a different point of view, but the facts about such matters as land sales, the immigration, beginnings of agriculture, mining, commercial institutions and so forth, are here firmly established from the records, and tied in to the lives of the individual innovators. The chapter on the effects of the gold discoveries seems a little flat, but that may be deliberate. There is such an atmosphere of furious excitement about that story in any discussion of New South Wales and Victoria that a quieter treatment may remind us of what is, indeed, the most general theme of this distinguished book: that "the short past of this young nation has been seen too often through eastern eyes".

Dr. Pike is to be congratulated on having got this load off his chest. The book has most justly earned him a D. Litt. The occasional irony of his style, the mingling of love and repulsion which colours his attitude towards South Australian society, should now find full and free expression in an account of the century of South Australia, 1857—1957, which could be the first mature work of social history to be written in this country.

J. A. La Nauze

University of Melbourne.

BOOKS RECEIVED*

A.—AUSTRALIAN AND NEW ZEALAND PUBLICATIONS

BRUNS, GORDON R. *The Stock Exchange.* (2nd Ed.) (Privately printed, 1957. Obtainable from Publisher's Associates, 21 Huntingfield Road, Brighton, S.5, Victoria.) Pp. 80. 4/6 Aust., including postage in Australia.

This edition has been considerably enlarged. As before, the booklet is in six chapters: the first deals with the origin and purpose of Stock Exchanges; the second with their growth and spread to the New World; the third with types of securities traded and listing requirements, and the fourth with the working of the Melbourne exchange. The last two chapters relate to the economic function of Stock Exchanges, and in this context include a discussion of liquidity and speculation.

CHAMBERS, R. J. *Accounting and Action. An Introduction to the Methods and Scope of Accounting.* (Law Book Co. of Australasia, Sydney, 1957.) Pp. 248. 27/6 Aust.

LOWNDES, A. G. (ed.) *South Pacific Enterprise. The Colonial Sugar Refining Company Limited.* (Angus and Robertson, Sydney, 1956.) Pp. 500. 42/- Aust.

This is a collection of fifteen essays describing the history and the activities of the Company since its inception in 1855. Some very good, amply illustrated, chapters explaining the technical aspects of sugar production are included. The sections dealing with the existing company, its policies and its place in industry present an interpretation favourable to the company. Designed for a wide audience, the book could be useful for the critical student who is willing to consult other sources of information.

PERKINS, J. O. N. *Sterling and Regional Payments Systems.* (Melbourne University Press, Carlton, Victoria, in association with the Australian National University, 1956.) Pp. 171. 30/- Aust.

WILLIAMS, D. B. *Economic and Technical Problems of Australia's Rural Industries.* (Melbourne University Press, Carlton, Victoria, 1957.) Pp. 146. 27/6 Aust.

B.—OTHER PUBLICATIONS

BASU, S. K. *Place and Problems of Small Industries.* (A Mukherjee, Calcutta, 1957.) Pp. 97. Rs. 4/-.

BHARGAVA, R. N. *The Theory and Working of Union Finance in India.* (Allen & Unwin, London, 1956.) Pp. 308. 30/- stg.

BOUSTEDT, OLAF, and RANZ, HERBERT. *Regionale Struktur-und Wirtschaftsforschung.* (Walter Dorn, Bremen-Horn, 1957.) Pp. 218. DM 16.

BUBLOT, GEORGES. *La Production agricole belge. Etude économique séculaire.* (Nauwelaerts, Louvain, 1957.) Pp. 419. 370 fr.b.

CEYLON, UNIVERSITY OF. *The Disintegrating Village.* Part I. (Ceylon University Press Board, Colombo, 1957.) Pp. 83. No price stated.

CHAMBER OF COMMERCE OF THE UNITED STATES. *The Statistical Bases of Concentration Ratios.* (Chamber of Commerce of the United States, Washington, 1957.) Pp. 26. 50 cents.

DHAR, BIMALENDU. *The Sterling Balances of India.* (Nababharat, Calcutta, 1956.) Pp. 142. Rs. 7/8.

DURAND, DAVID. *Bank Stock Prices and the Bank Capital Problem.* (National Bureau of Economic Research, New York, 1957.) Pp. 68. $1.00.

INDIA, GOVERNMENT OF (Dept. of Economic Affairs, Ministry of Finance). *The National Sample Survey. General Report No. 1 on The First Round.* (Central Statistical Organization, New Delhi, 1952; reprinted 1956.) Pp. 172. No price stated.

INDIA, GOVERNMENT OF (Directorate of Economics and Statistics, Ministry of Food and Agriculture). (Manager of Publications, Delhi.) *Agricultural Legislation in India.* Vol. I: *Regulation of Money-Lending.* (1956.) Pp. 217. Rs. 5/-.

* Acknowledgment of publications does not guarantee review.

Agricultural Statistics of Reorganized States. (1956.) Pp. 87. No price stated.

Cotton in India, 1950-51 to 1954-55. (1956.) Pp. 74. Rs. 3/8.

Indian Crop Calendar. (Third Issue.) (1956.) Pp. 97. No price stated.

Jute in India 1954-55. (Seventh Issue.) (1956.) Pp. 31. No price stated.

Oil Seeds in India 1954-55. (1955.) Pp. 82. No price stated.

Studies in Agricultural Economics. Vol. II. (1956.) Pp. 170. No price stated.

Sugar in India. (Supplement.) *1951-2 and 1952-3.* (1954.) (Third issue.) Pp. 49. No price stated.

INNIS, HAROLD A. *Essays in Canadian Economic History.* (Edited by Mary Q. Innis.) (University of Toronto Press, 1956.) Pp. 418. $8.50.

With the death of Professor Innis in 1952, Canada lost one of her pioneers in the study of economic history. His great works, *The Fur Trade in Canada* and *The Cod Fisheries,* are already well known. With the assistance of the present volume of essays, we now have a clear picture of the development of this scholar's thought as he studied the basic historical trends of his homeland. Appropriately, for a man whose counsel was sought by governments, Innis never divorced the study of economic problems from the context of their political and scial environment, and much that he has written on Canadian economics and economic history might be applied to the Australian scene.

INTERNATIONAL BUREAU OF FISCAL DOCUMENTATION. *Annual Report 1956.* (Amsterdam, 1957.) Pp. 19. No price stated.

KHAN, MOHD. SHABBIR. *Schumpeter's Theory of Capitalist Development.* (Muslim University, Aligarh, 1957.) Pp. 175. No price stated.

MACDOUGALL, DONALD. *The World Dollar Problem.* (Macmillan, London, 1957.) Pp. 622. 72/- Aust.

MUNBY, D. L. *Christianity and Economic Problems.* (Macmillan, London, 1956.) Pp. 290. 41/6 Aust.

In attempting to bridge the gap between the thinking of economists and theologians the author has undertaken a task of fundamental importance. The attempt has not proved wholly successful because the author has tried to compress a *Summa Theologia* and a *Principles of Economics* within the covers of one small book. More importantly, Mr. Munby has underestimated the extent of the gap which separates the economist and the theologian. The present-day economist—heir to the teaching of the classical economists who tended to conceive economic laws on the analogy of mechanical laws of physical science—tends to exclude moral and ethical factors altogether. With his fellow men, he is part of a civilization secular in spirit and ideals, where much of what Mr. Munby has to say sounds unreal. While this book is evidence of great faith and great courage the gap separating the two orders of reality—the natural and the supernatural—remains unclosed.

MUNSHI, M. C. *A Report on Productivity.* (*The Eastern Economist,* New Dehli, 1957.) Pp. 62. Rs. 1/8.

NEUMARK, S. DANIEL. *The South African Frontier. Economic Influences 1652-1836.* (Stanford University Press, Stanford, 1957.) Pp. 196. $5.00.

OSAKA PREFECTURE, UNIVERSITY OF. *Bulletin.* (Series D Sciences of Economy, Commerce and Law.) Volume I. (Sakai, Japan, 1957.) Pp. 137. No price stated.

PARSONS, TALCOTT, and SMELSER, NEIL J. *Economy and Society.* (Routledge and Kegan Paul, London, 1956.) Pp. 322. 35/- stg.

RAMSAY, G. D. *English Overseas Trade during the Centuries of Emergence. Studies in Some Modern Origins of the English-Speaking World.* (Macmillan, London, 1957.) Pp. 279. 49/9 Aust.

SARKAR, N. K. *The Demography of Ceylon.* (Ceylon Government Press, 1957.) Pp. 289. Rs. 10.45.

SAYERS, R. S. *Central Banking after Bagehot.* (Oxford University Press, 1957.) Pp. 149. 29/9 Aust.

SHANNON, F. JOHN. *The Conflict Between Law and Adminstrative Practice in Valuation of Property for Taxation in Kentucky.* (University of Kentucky, Lexington, 1957.) Pp. 112. No price stated.

SHARMA, S. L. *Some Trends of Capitalist Concentration in India.* (P. C. Dwadash Shreni, Aligarh, 1955.) Pp. 218. Rs. 7/4.

SHARMA, SRIRAM. *A Constitutional History of India.* (Second Edition.) (Macmillan, Bombay, 1955.) Pp. 342. 16/9 Aust.

Victorian Studies. (Indiana University, Bloomington, Indiana.) $5.00 a year.

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